United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
08ESMF00-2012-F-0398

APR 04 2014

Ms. Jane M. Hicks
Chief, Regulatory Division
Attn: Lisa Mangione
U. S. Army Corps of Engineers
San Francisco District
1455 Market St., Floor 17
San Francisco, California 94105-2197

Subject: Programmatic Formal Endangered Species Consultation on the Santa Clara Valley Water District Stream Maintenance Program in Santa Clara County, California

Dear Ms. Hicks:

This is in response to your August 11, 2011, letter requesting formal consultation with the U.S. Fish and Wildlife Service (Service) the proposed Santa Clara Valley Water District's Stream Maintenance Program (Proposed Action) in Santa Clara County, California. Your request was received on August 15, 2011. At issue are effects of the Proposed Action on the federally listed endangered Coyote ceanothus (*Ceanothus ferrisae*) (ceanothus), endangered Metcalf Canyon jewelflower (*Streptanthus albidus* ssp. *albidus*) (jewelflower), endangered Santa Clara Valley dudleya (*Dudleya setchellii*) (dudleya), and endangered Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*) (paintbrush), threatened bay checkerspot butterfly (*Euphydryas editha bayensis*) (bay checkerspot), threatened California red-legged frog (*Rana aurora draytonii*) (red-legged frog) and designated critical habitat, Central Distinct Population of California tiger salamander (Ambystoma californiense) (tiger salamander) and designated critical habitat, endangered California clapper rail (*Rallus longirostris obsoletus*) (clapper rail), endangered California least tern (Sterna antillarum browni) (least tern), endangered least Bell's vireo (*Vireo bellii pusillus*) (vireo), endangered California condor (*Gymnogyps californianus*), endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) (harvest mouse), endangered San Joaquin kit fox (Vulpes macrotis mutica) (kit fox), and threatened Pacific coast population of the western snowy plover (*Charadrius alexandrinus nivosus*) (snowy plover). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The Service has determined that the Proposed Action is not likely to adversely affect the California condor, San Joaquin kit fox, bay checkerspot butterfly, Tiburon paintbrush, Coyote ceanothus, Santa Clara Valley Dudleya, or Metcalf Canyon Jewelflower.

Our determination that the Proposed Action is not likely to adversely affect the California condor

is based on the following factors:

- If condors occur in the Action Area at all, now or in the future, they would likely occur as foragers in extensive grasslands offering carrion rather than in areas where Stream Maintenance Program (SMP) activities will occur (SCVWD 2011).
- Rodenticides will not be used as part of the SMP animal conflict management program and will avoid secondary poisoning of condors.

Our determination that the Proposed Action is not likely to adversely affect the San Joaquin kit fox is based on the following factors:

- Within the Action Area, the San Joaquin kit fox is expected to occur only by dispersing occasionally in the vicinity of Pacheco Creek and the uppermost reaches of the Pajaro River, upstream from the Llagas Creek confluence. Even in those areas, kit fox occurrence is expected to be extremely infrequent, and at most, very low numbers of individuals would move through those areas during dispersal between areas of known breeding activity outside the Project Area (SCVWD 2011).
- No SMP activities are projected within the portion of Santa Clara County where kit foxes could occur.

Our determination that the Proposed Action is not likely to adversely affect the Tiburon paintbrush or coyote ceanothus is based on the following factors:

- High-quality serpentine communities do not occur in or adjacent to natural stream channels in the Action Area (canals are excluded from the Project Description).
- Neither the Tiburon paintbrush nor coyote ceanothus is known to occur in or very close to areas where SMP activities are either projected or expected to occur. Because of the intensity of survey effort for these species over the years, both on Santa Clara Valley Water District (SCVWD) facilities and in general, there is no expectation that a previously unknown occurrence would be located, or would appear during the period 2012-2022, in an area where it could be affected by SMP activities (SCVWD 2011).
- Conservation measures incorporated into the Project require the complete avoidance of all direct and indirect effects on Tiburon paintbrush and Coyote ceanothus. Individuals of these species will be surveyed for during pre-activity surveys that are located within serpentine habitat, and if any individuals are found, SMP activities will be modified to ensure complete avoidance of adverse effects on these species.

Our determination that the Proposed Action is not likely to adversely affect the Bay checkerspot butterfly, Santa Clara Valley Dudleya or Metcalf Canyon Jewelflower is based on the following factor:

- The SCVWD revised the project description to avoid work in or near canals and serpentine areas where these species occur or may occur.

Critical habitat has not been designated for the snowy plover, salt marsh harvest mouse, least Bell's vireo, California least tern, or California clapper rail, therefore, none will be affected. This document represents the Service's biological opinion on the effects of the Proposed Action

on the California red legged frog, California tiger salamander, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, least Bell's vireo, and designated critical habitat for the California red legged frog and California tiger salamander. The following sources of information were used to develop this biological opinion: (1) the *Biological Assessment, Santa Clara Valley Water District Stream Maintenance Program, Santa Clara County, California*, dated March 2012 (SCVWD 2011); (2) the U.S. Army Corps of Engineers August 11, 2011; (2) phone calls and emails between SCVWD, the Corps, and the Service; and (5) and other information available to the Service.

Consultation History:

August 15, 2011: The Service received the formal consultation request letter and Biological Assessment from the Corps.

February 6, 20013: The Service, Corps, and SCVWD discussed outstanding California red-legged frog compensation, discrepancies of threatened and endangered species habitat maps between the BA and Santa Clara Valley Habitat Plan, and efforts between the Corps and SCVWD to identify 'no effect' areas.

April 4, 2013: The Service provided comments on the proposed SMP program in a letter dated April 4, 2013.

June 6, 2013: The Service, Corps, and SCVWD discussed the April 4, 2013 comment letter including the following topics:

1. Programmatic approach for the biological opinion.
   a. Evaluation of interrelated and interdependent activities.
   b. Species compensation may be 'out of sync' for the first year, but thereafter it will need to stay ahead.
   c. Due to Environmental Protection Agency injunction, the biological opinion will not authorize 'take' for herbicides or surfactants.
2. SCVWD will use the Valley Habitat Plan when possible.
3. Addendum to the BA.
   a. Canals have been removed from the proposed project.
   b. The Corps is considering a 'no effect' determination for the tidewater goby.
   c. BMP's will describe how they minimize adverse effects to species.

March 6, 2014: The Service provided the Corps and SCVWD comments and questions related to the formal consultation.

March 10, 2014: The SCVWD provided an email response with information and clarifications' to the Service's March 6, 2014 email.

March 14, 2014: The Service requested updated information summarizing anticipated adverse and beneficial effects by activity type based on current

project limits.

March 20, 2014: The SCVWD provided updated information summarizing anticipated adverse and beneficial effects by activity type based on current project limits.

April 3, 2014: The SCVWD provided updated information summarizing conservative estimates of anticipated harassment to California least tern(s) and snowy plover(s).

PROGAMMATIC BIOLOGICAL OPINION

Description of the Proposed Programmatic Actions

Program Purpose and Project Area

The U.S. Army Corp of Engineers (Corps) proposes to issue a Regional General Permit (RGP) pursuant to Section 404 of the Clean Water Act (CWA) to the SCVWD for its SMP. The RGP for which the SCVWD is applying would authorize implementation of routine stream maintenance activities subject to Corps jurisdiction for a 5-yr period. Pending SMP review and any necessary updates or revisions at the conclusion of the permit term (2014-2018), the RGP may serve as a basis for issuing a second 5 year permit term (2019-2023).

Stream maintenance is required to meet the SCVWD's flood protection objectives. The SCVWD routinely removes sediment from channels, and associated facilities to restore their capacity. Vegetation is routinely removed from channels, as well as areas in and around channels, to meet flood protection objectives, provide access and to prevent fires. The SCVWD conducts bank stabilization activities to restore eroded banks, levees, and beds, and to protect facilities. The SMP includes a regional compensation program to compensate for loss of sensitive habitats. The Project Area includes 748.35 miles of channels in the Santa Clara Basin and 264.34 miles of channels in the Pajaro Basin.

SMP activities may occur anywhere below the 1000-foot elevation contour where SCVWD has ownership or easement or where directed by the SCVWD Board of Directors. However, most activities are expected to occur on the valley floor and adjacent foothills.

For purposes of this document the area between the top of the banks or levees are referred to in general as channels. Channels may include streams, creeks, rivers, sloughs, and flood control channels.

SMP Duration and Activities Cycle

This Programmatic Biological Opinion will be effective for a period of 10 years from the date of issuance of the Corps permit.

Each year, a SMP project notification packet will be submitted to the Service and Corps. The SMP notification packet will contain a detailed description of each of the proposed projects to be

completed during the year, the annual compensation plan to be achieved prior to or concurrent with project implementation, and supporting materials as described in the Notice of Proposed Work. The Corps and SCVWD SMP Manager will conduct a pre-implementation field tour and meeting each year. The Corps will then request that the proposed projects be appended to this Programmatic Biological Opinion. The Service will respond to the Corps with a letter appending that year's projects as appropriate to this Programmatic Biological Opinion.

At the conclusion of each year's instream maintenance season an Annual Summary Report (ASR) will be prepared and submitted to the Service. This report will include: a summary of the year's maintenance projects describing what activities occurred and where; a description and confirmation of the restoration and compensation activities implemented during the current year; a cumulative summary of SMP impacts to date (i.e., the Year 10 summary will include the total, cumulative impacts of the SMP); a cumulative summary of compensation activities to date; and other program updates as necessary. Following the submittal of the annual summary report, the SCVWD's SMP Manager will conduct a post-implementation field tour and meeting if requested by the Corps and/or Service.

Work Activities

Future SMP work is based on analysis of historical data for the period 2002-2010 and will adhere to program limits specified in the 2014-2023 SMP Manual and herein. These limits may vary for three different types of channels:

- Modified channels – channels that have been significantly altered from historical conditions. Modified channels typically include realigned, straightened, improved or hardened reaches designed to maximize efficient flow of water to minimize erosion. These channels are typically grass-lined or concrete lined (bed or bank), and may include a high flow channel. These channels may have the potential for some environmental enhancement but are differentiated from "modified channels with ecological values" that have existing and often diverse ecological values present.

- Modified channels with ecological values – channels that have been significantly altered from historical conditions but that have features such as closed canopy riparian woodland, and/or that are known to support special-status species. These channels include realigned, straightened, improved or hardened reaches designed to move flood flows with minimum erosion. They must have earthen beds but may or may not have concrete banks. Modified channels with ecological value include creeks that have been identified as supporting steelhead and fall-run Chinook (14 channels) or green sturgeon (the latter in SF Bay tidal areas only).

- Unmodified channels – channels which are largely unchanged from historic conditions. Unmodified channels may have small areas of modification including bridges, outfalls, culverts, gauges, or other appurtenant structures. Unmodified channels are usually located in areas adjacent to floodplains without other types of flood protection measures and are generally in the foothills or higher elevations of the program area.

Sediment removal, vegetation management, bank stabilization, minor maintenance, and animal

conflict management activities and limits are identified herein and in the 2014-2023 SMP Manual. Actual channel maintenance activities vary from year to year depending on recent weather and hydrologic conditions, frequency and extent of past maintenance activities, and budget/funding availability.

Maintenance Guidelines are documents that describe acceptable channel conditions and are used to identify when channel maintenance is needed. Maintenance Guidelines will be used (where they exist) or developed for selected reaches to document acceptable channel conditions using established, quantifiable thresholds and criteria such as design flood return period, design flow, roughness coefficient, sediment accumulation, vegetation growth, and channel characterizations.

Where Maintenance Guidelines have not yet been updated or developed, sediment removal and vegetation management activities will follow an interim process described in Section 3.2 of the 2014-2023 SMP Manual and the criteria and thresholds identified in Section 3.6.2 of the 2014-2023 SMP Manual. During this interim process, SCVWD staff rely on data from the as-built plans and associated flow data, including the cross sections. In addition, data from waterways model and the corresponding information from the *Maps of Flood Control Facilities and Limits of 1% Flooding* prepared by the SCVWD in 1993 will be used. This document provides channel dimensions and type (e.g. natural, concrete, levee) on a reach by reach basis for channels as well as dimensions and types for other instream features such as culverts and bridges. Inspection staff conduct a visual assessment of the channels. Potential deficiencies are documented on inspection forms and photos are taken of the sites. Information gathered during the inspections is forwarded to technical staff for quantitative analysis and assessment, which may include the collection of survey data and hydraulic modeling. Finally, SCVWD staff meet to review each site, prioritize the site for maintenance, and determine the appropriate course of actions to remedy the deficiency.

1. Bank Stabilization

Channel bank stabilization activities involve actions by SCVWD to repair channel banks, levees, and beds that are eroding or are in need of erosion protection. SCVWD may implement channel bank stabilization when the problem: (1) causes or could cause significant damage to SCVWD property and/or adjacent property or (2) is a public safety concern. When the SCVWD proposes bank stabilization projects, the Notice of Proposed Work (NPW) will describe the damage or public concern that is being addressed.

Sites with eroding or destabilized banks are evaluated for their local on-site soil conditions, slope stability, channel position, and geomorphic processes. An overall assessment is performed to determine the most appropriate treatment to stabilize the bank, with consideration of habitat, species use, and other site beneficial uses. Repairs may take several forms from installing "hard" structures (e.g., concrete and sacked concrete) to "soft" structures (e.g., willow brush mattresses, log crib walls, pole-plantings) or a combination of hard and soft structures. Based on the condition assessment, the SCVWD design engineer will develop a treatment approach that stabilizes the channel bank while trying to avoid and minimize the use of hardscape.
Bank stabilization methods are described in Chapter 6 and Appendix A of the 2014-2023 SMP Manual. Table 6.1 of the 2014-2023 SMP Manual summarizes the SCVWD's 12 bank stabilization methods within the SMP. In general bank stabilization methods are described as hard, hybrid, or soft depending upon the degree of bank hardening involved. As shown in Table

6.1 of the 2014-2023 SMP Manual, "hard" methods may include concrete blocks, sacked concrete, boulders, or other hardened materials. "Soft" methods may include biotechnical treatments emphasizing vegetation and earthen banks, and "hybrid" methods are typically earthen bank repairs that include some type of rock material in the lower bank zone to provide additional strengthening. Table 6.1 of the 2014-2023 SMP Manual also summarizes the applicable compensation ratio for each treatment method and whether regulatory agencies require review of the project.

Bank Stabilization Limits

The annual bank stabilization limit is one (1) linear mile of channel (5280 ft). Hardscape projects may not exceed 20 percent (maximum of 1056 ft) of the linear footage of total bank stabilization projects in a given year. Hybrid treatments are not included in the hardscape category that is limited to the 20 percent annual amount.

Equipment used for bank stabilization activities may include excavators, bulldozers, and front-end loaders for bank grading and earth moving activities. Staging will occur on adjacent access roads or lands. Soil and other repair materials are staged in areas that have been previously disturbed (service road, turn-outs, etc.). In some cases, bank stabilization projects may require the installation of temporary roads and ramps to access the work area.

Bank stabilization projects may begin as early as June 15 and continue through October 15. After October 15 new work or ongoing work may be conducted until there is a 72 hour forecast of 0.5 inches of rain within the project watershed.

Bank stabilization work can be performed in any channel within the work area where SCVWD has fee title or easement, or in areas that are affecting the stability of SCVWD properties. Based on past work records, SCVWD stabilizes about 1.0 mile of channel bank per year (approximately 0.75 mile in the Santa Clara Basin and 0.25 mile in the Pajaro Basin). From 2001 to 2012, bank stabilization was accomplished using approximately 23 percent hard and 77 percent soft techniques.

2. Sediment Removal

Sediment removal may occur along channels, or at SCVWD appurtenant structures (stream gauges, flap gates, outfalls). Sediment is removed from SCVWD facilities when accumulated sediment reduces a channel's flow conveyance capacity, prevents facilities or appurtenant structures from functioning as intended, or impedes fish passage and access to fish ladders. Sediment removal under the SMP does not include increasing a channel's flow conveyance capacity.
Sediment removal involves mechanically removing sediment that has been deposited within a channel, as well as removal of vegetation growing on the accumulated sediment. Typically, sediment may be removed using excavators, grade-alls, draglines, and/or loaders. Temporary dams, pipes, and existing overflow channels are used if water must be bypassed around the site during work. Sediment removed from the channel is prepared for off-site hauling, disposal, and/or re-use. Temporary stockpiling, to allow for drying prior to disposal, may occur only where there is sufficient space outside the stream channel to allow for the temporary piling of material. Sediment removal normally occurs from June 15 – October 15 but may extend until the

first 72-hour forecast that includes 0.5 inches of rain within the project watershed.

Sediment Removal Limits

For channel reaches classified as *modified channels*, sediment removal projects must comply with the quantitative objectives established by the Maintenance Guidelines where Maintenance Guidelines exist, as identified in Section 3.2 of the 2014-2023 SMP Manual. Sediment removal in modified channels will not exceed 5,000 linear feet for individual projects (though there is a process by which the SCVWD could seek exceptions to this limit from the Corps, Regional Water Quality Control Board (RWQCB), California Department of Fish and Wildlife (CDFW), and National Marine Fisheries Service (NMFS) on a per-project basis). The amount of sediment removed may not exceed the established maintenance baseline (i.e., the amount of sediment removal necessary to achieve the necessary channel capacity and function).

"The maintenance baseline" as developed/established by the Maintenance Guideline, is a description of the physical characteristics (e.g., depth, width, length, location, configuration, or design flood capacity, etc.) of a channel or channel reach that defines the limits of maintenance activities authorized under the SMP, subject to any case-specific conditions. Where no maintenance baseline has been established by an approved Maintenance Guideline, maintenance shall be conducted in accordance with Section 3.6.2 of the SMP Manual. The agencies will approve the maintenance baseline via the Maintenance Guideline based on the approved or constructed capacity of the channel or channel reach. The SCVWD will determine the maintenance baseline through development of Maintenance Guidelines for the channel or channel reach as specified in Chapter 3.6.4 of the SMP Manual. In addition to the Maintenance Guidelines, the SMP Manual includes best management practices to ensure that the impacts to the aquatic environment are minimal, especially in *modified channels* with ecological values and unmodified channels. (The permitting agencies may request maintenance records in areas where there has not been recent maintenance). Revocation or modification of the of the maintenance baseline established through the Maintenance Guidelines development process can only be done by written mutual agreement between the SCVWD and permitting agencies. The SMP authorizations cannot be used until the permitting agencies approve the maintenance baseline, either by approving the relevant Maintenance Guidelines, or following review of the supplemental information specified in Chapter 3.6.2 (for channels without approved Maintenance Guidelines). The annual NPW shall include all information required to demonstrate that proposed maintenance activities will be implemented consistent with the maintenance baseline as defined above, and shall determine the need for mitigation and any channel or activity-specific conditions. Once determined through the Maintenance Guideline development process, the maintenance baseline will remain valid for any subsequent reissuance of the SMP authorizations. For channel reaches classified as either modified with ecological values or unmodified, sediment removal projects must comply with the quantitative objectives as established by the Maintenance Guidelines where Maintenance Guidelines exist, as identified in Section 3.2 of the 2014-2023 SMP Manual. Sediment removal in unmodified channels and modified channels with ecological values will not exceed 300 linear feet for individual projects (though there is a process by which the SCVWD could seek exceptions to this limit from the Corps, RWQCB, CDFW, and NMFS on a per-project basis). Sediment removal from unmodified channels and modified channels with ecological values must be associated with a facility or manmade structure (i.e., bridge, outfall, gauge, grade control, etc.). "Associated" is defined as one or more portions of the

sediment removal reach are located 100 feet or less from the structure or facility. The amount of sediment removed may not exceed the established maintenance baseline.

Sediment Removal Annual Limits

During the period 2001-2012, the SCVWD conducted an average of 16 projects (with a range of 11 to 30) per year in modified channels, and an average of 3.5 projects (with a range of 1 to 8) per year in other channels. Applying the sediment removal linear distance limits for the period 2014-2023 to these numbers, the SCVWD can be reasonably expected to remove sediment from approximately 80,000 linear feet of modified channels (16 by 5,000), and approximately 1,050 linear feet (3.5 by 300) of modified with ecological value channels and unmodified channels annually under SMP2. This would equate to a total of approximately 810,050 linear feet of sediment removal projects over the 10-year life of the Program.

3. Vegetation Management

Similar to sediment removal activities, vegetation management activities are intended to maintain the hydraulic conveyance, flood safety functions, fire protection, and access to the SCVWD's channels. Vegetation management is also performed to protect the ecological health of trees and vegetation communities. For example, cankers or split trunks, weak branch attachment, or multiple dense stems can reduce tree health and vigor, and removal of such trees (or individual limbs) can prevent spread of disease or improve the health and vigor of individuals.

Vegetation management techniques include hand removal and pruning using small tools and hand-held equipment (e.g. chainsaws, weed-eaters, flamers, etc.), mechanical removal using heavy equipment, and grazing. Hand removal, pruning, and mowing may occur from the channel center to the 'outboard' edge of the SCVWD property line/SCVWD management area.

Heavy equipment used for vegetation removal may include flail mowers to cut weeds and other vegetation on the inside slope of some levees or channel banks. Vegetation management requiring large mechanized equipment will typically occur from the top-of-bank access road and the upper bank/bench. Large mechanized equipment will not be used to cross an active/wet stream channel for vegetation management purposes. Vegetation management occurring in mid-channel areas that are separated by active wet channels will only be conducted with hand-held tools (including mechanized hand-held tools) to prevent the need for crossing an active wet stream course with large mechanized equipment.

The work windows for vegetation management activities are as follows:

1. Instream (wetted area) hand pruning and hand removal may occur year round, except:

   In anadromous salmonid streams, in-stream hand pruning and hand removal work may occur from June 15 until December 31 or until local rainfall greater than 0.5 inches falls within the subject watershed within a 24-hour period, whichever transpires first.

2. Hand pruning, hand removal, large woody debris removal, flaming, and grazing outside the bankfull channel may occur year round, weather permitting.

3. Mowing outside the bankfull channel may occur from February 1 through November 30.

Vegetation Management Limits

A. Pruning

Routine pruning activities include removal of overhanging growth from maintenance access roads and fence lines.

The following limits will apply:

10-year Program Limit:	40 acres
Annual Limit:	8 acres (20% of 10-year limit)
Per-Project Limit:	No more than 20% canopy removal within the reach

B. Coppicing

Coppicing will not have limits on its geographic extent because the activity is not widespread and serves to provide an ecological benefit. No more than 20% canopy removal will be allowed in any reach. Assessment of canopy removal is made visually based on the pre-maintenance condition.

C. Tree Removal

Removal of Trees 6-12" diameter at breast height (dbh). The following limits will apply:

10-year Program Limit:	2000 live trees
Annual Limit:	400 live trees (20% of 10-year limit).
Per-Project Limit:	No more than 20% canopy removal in any reach
Other:	No limits on trees within 100 feet of bridges, due to public safety concerns

Removal of Trees <6" dbh. No limits are proposed.

D. Large Woody Debris (LWD)

LWD maintenance activities apply to woody debris greater than 12" diameter. No limits are proposed.

E. Mowing, Flaming and Grazing

No limits on these activities for the following reasons:

1. Activities are generally conducted in areas of ruderal vegetation, dominated by non-native annuals, and as such have little ecological impact

2. Activities are likely to benefit native plant species

3. Activities are necessary in order to meet fire standards (non-discretionary)

4. On Corps levees, activities are necessary to meet Corps requirements (non-discretionary)

4. Management of Animal Conflicts

In the SMP area and around SCVWD facilities, animal activities can conflict with SCVWD maintenance activities or damage infrastructure. Conflicting animal activities include those that result in reduced stability of banks and levees (e.g., burrowing) and/or interfere with work activities. Management of animal conflicts refers to the use of various techniques to reduce conflicts between SCVWD facilities and local species. Managing animal conflicts may include the use of avoidance tactics, biological control (e.g., the use of insects to control other insect pests or to control plant species or physical barriers such as tree protector tubes or cages to deter nuisance species), physical alterations (e.g., filling burrows with slurry material such as bentonite clay or installing netting on trees or structures to prevent birds from nesting), physical barriers, and non-lethal trapping (e.g. trapping and relocation of nuisance species).

Management of animal conflicts is generally conducted with the use of hand-placed materials using small tools and hand-held equipment. However, heavy equipment may be used to modify habitat conditions by reducing or eliminating burrowing animals through surface compaction or filling of burrows with bentonite slurry.

Management of Animal Conflict Limits

Animal conflict management activities involving surface compaction, filling of burrows, and tilling above ordinary high water will not exceed 42 linear miles during the period 2014-2023.

5. Minor Maintenance

Minor maintenance activities are small in scope. A minor maintenance activity is defined as an activity that results in removing less than 0.08 acre (3485 square ft) of wetland or riparian vegetation. The minimum reporting size for any minor vegetation work is 0.01 acre (436 square ft) per project, which includes any vegetation work necessary for access or staging.

Minor maintenance activities may be performed year round or within the work window for specified work activities. Minor sediment or vegetation work must comply with the work windows specific to those work activities, even when they are minor maintenance activities. Minor maintenance activities will adhere to the 2014-2023 SMP Manual Program Limits.

Minor Maintenance Limits

Per-Project Limit:	0.08 acres of riparian and wetland vegetation
Annual Limit:	0.4 acres of riparian and wetland vegetation
Program Limit:	5-year program limit is 2.0 acres; 10-year program limit is 4.0 acres.

Other: Minor maintenance activities are limited to actions that result in temporary impacts and may not include any actions that result in permanent impacts (i.e., construction of a new structure). To ensure that SMP projects are unconnected, single and complete actions and not

part of a larger action that will exceed the SMP's per-project size and placement limits, each project must demonstrate independent utility. An SMP project will be considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility. A separation of 500 feet between sites is also required.

Minor Maintenance activities include:

1. Minor sediment removal – 25 cubic yards or less of material at outfalls, culverts, flap gates, tide gates, inlets, grade control structures, fish ladders, fish screens, bridges, canals, streamflow measuring stations (stream gauges) to maintain functions of such structures. Minor maintenance work at these facilities is limited to 25 cubic yards per facility. Removal of sediment cannot extend farther than 100 feet in any direction from the structure;

2. Trash and debris removal that require ground disturbance;

3. Repair and installation of fences and gates, when such repairs or installations; require ground disturbance;

4. Grading and other repairs to restore the original contour of existing maintenance roads;

5. Grading small areas above channel banks to improve drainage and reduce erosion;

6. Repair of structures with similar materials within the same footprint (such as replacement of concrete linings, culverts, pipes, valves or similar structures; or repairing a weir, in-stream orifice, or communication pipe). Similar materials means that materials will be replaced in-kind, such that hardscape and softscape facilities will be replaced with similar materials, respectively;

7. Installation and on-going maintenance of mitigation and landscape sites, including: irrigation, weed control, replanting of dead or declining individual plants, and other types of ongoing maintenance at mitigation sites until such time when the success criteria are met or the site fulfills the establishment phase requirements;

8. Removal of obstructions, other than sediment and large woody debris, at structures such as bridges (not to exceed 100 feet upstream and downstream of a bridge), streamflow measuring stations (stream gauges), box culverts, storm drain outfalls, and drop structures to maintain functions of such structures. See Chapter 4 of the 2014-2023 SMP Manual for vegetation removal requirements;

9. Stream gauge maintenance, including stilling well cleaning, painting of gauge house, replacing/adding antenna or solar panels to existing structures, replacing instrumentation, cableway repair, weir cleaning of algae and debris, and

unburying staff markers/orifice/communication pipes.

6. Avoidance, Minimization, and Conservation Measures

The maintenance activities in the SMP incorporate a range of measures to minimize undesired effects on the environment. Best Management Practices (BMPs) specifically created for the Proposed Action encompass the SMP's range of activities and the environmental conditions of the Action Area. Types of BMPs include general BMPs that apply to all work, as well as activity-specific BMPs designed to address anticipated effects of certain work activities or particular types of resources. BMPs specific to avoidance and minimization of impacts to the California red-legged frog, California tiger salamander, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo will be implemented. The following BMP's are presented consistent with the 2014-2023 SMP Manual (e.g. **BMP GEN-3**)

<u>California Clapper Rail, California Least Tern, Least Bell's Vireo, and Snowy Plover</u>

BMP GEN-3: Avoid Exposing Soils with High Mercury Levels – Sediment removal and bank stabilization projects in portions of the Guadalupe River watershed affected by historic mercury mining may expose soils containing mercury.

In specified maintenance reaches in the Guadalupe River Basin, soils that are likely to be disturbed or excavated shall be tested for mercury. Soils shall be remediated if:

1. disturbed or excavated soils exposed to streamflow below the elevation of the 2.33-year flow event exceed 1 part per million Hg; or

2. disturbed or excavated soils above the 2.33-year flow level exceed 20 parts per million mercury.

Remediation may be accomplished either by:

1. Treating the site so that contaminated soils excavated for the purpose of bank stabilization shall not be susceptible to erosion; or

2. Further excavating contaminated soils and replacing them with clean fill or other bank stabilization materials that are free from contaminants.

3. Soils with mercury concentrations exceeding 20 mg/kg shall be removed and disposed of in a Class I landfill following established work practices and hazard control measures. Soils with mercury concentrations less than 20 mg/kg will remain at the project site.

BMP GEN-6: Minimize Impacts to Nesting Birds via Site Assessments and Avoidance Measures

1. For activities occurring between January 15 and August 31, project areas will be checked by a qualified biologist or Designated Individuals (DI – for limited ground nesting species surveys), for nesting birds within 2 weeks prior to starting work. If a lapse in project-

related work of 2 weeks or longer occurs, another focused survey will be conducted before project work can be reinitiated.

2. If nesting birds are found, a buffer will be established around the nest and maintained until the young have fledged. Proposed buffer widths are 0.5 mile for bald and golden eagles; 700 feet for the California clapper rail; 600 feet for the California least tern and western snowy plover; 250 feet for other raptors and the least Bell's vireo, herons, and egrets; 25 feet for ground-nesting non-raptors; and 50 feet for non-raptors nesting on trees, shrubs and structures. A qualified biologist may identify an alternative buffer based on a site specific-evaluation. No work within the buffer will occur without written approval from a qualified biologist, for as long as the nest is active.

3. All vegetation management, sediment reuse, road grading, or other SMP activities in or immediately adjacent to suitable California clapper rail habitat, as determined by a qualified biologist, shall not be conducted prior to September 1 (the non-nesting season).

4. The boundary of each buffer zone will be marked with fencing, flagging, or other easily identifiable marking if work will occur immediately outside the buffer zone.

5. All protective buffer zones will be maintained until the nest becomes inactive, as determined by a qualified biologist.

6. If monitoring shows that disturbance to actively nesting birds is occurring, buffer widths will be increased until monitoring shows that disturbance is no longer occurring. If this is not possible, work will cease in the area until young have fledged and the nest is no longer active.

BMP GEN-6.5: Protection of Nesting Least Bell's Vireos

1. To the extent feasible, SMP activities within those areas mapped as vireo habitat in the Santa Clara Valley Habitat Plan shall be scheduled to occur outside of the least Bell's vireo nesting season (March 15 – July 31).

2. For activities within woody riparian habitat mapped as vireo habitat in the Santa Clara Valley Habitat Plan that will occur between March 15 and July 31, any work will be preceded by a focused survey for least Bell's vireos. Pre-activity surveys will consist of two site visits, conducted on separate days within 14 days before the initiation of maintenance activities in the given area, with at least one of these surveys occurring within 5 calendar days before the initiation of such activities. Surveys will be conducted between dawn and 11:00 a.m., during mild weather conditions (i.e., not during excessive cold, heat, wind, or rain), within all riparian habitat in and within 250 feet of any proposed maintenance location along these reaches. The surveys will be conducted by a qualified biologist who is familiar with the visual and auditory identification of this species.

3. To minimize impacts to nesting least Bell's vireos and other birds, the biologist will not initially be looking for Bell's vireo nests during these surveys. Rather, the biologist will look and listen for individual vireos. If a least Bell's vireo is detected, it will be observed to determine whether it is actively nesting. The biologist will note the nest location, or if

finding the actual nest could result in excessive disturbance or risk damaging the nest, the biologist will determine the approximate location, based on observation of birds carrying nesting material, carrying food, or repeatedly visiting a certain area.

4. If an active nest is found, a minimum 250-foot no-activity buffer will be established around the nest. If a territorial male is found but no nest can be detected, then the approximate centroid of the bird's area of activity will be the point from which the buffer will be applied. The required buffer may be reduced in areas where dense riparian forest occurs between the construction activities and the active nest or where sufficient barriers or topographic relief exists to protect the nest from excessive noise or other disturbance. The biologist will coordinate with the USFWS and CDFW to evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis.

5. No work will occur within the buffer without verification by a biologist that the nest is inactive and until any fledged young are no longer dependent on adults for food.

California Clapper Rail and Salt Marsh Harvest Mouse

BMP GEN-11: Protection of Salt Marsh Harvest Mouse and California Clapper Rail

1. A SCVWD qualified biologist will conduct a desk audit to determine whether suitable salt marsh harvest mouse or California clapper rail habitat is present in or adjacent to a maintenance activity. The term "desk audit" is used to refer to an analysis conducted by a qualified biologist of the suitability of a site to support salt marsh harvest mice and/or California clapper rails. The desk audit is based on a review of available biological information about the site, including, but not limited to vegetation mapping conducted by Aerial Information Systems, Inc. for the SMP area; previously prepared biological resources reports (e.g., the *Final Environmental Impact Report for the Multi-Year Stream Maintenance Program* [SCVWD 2002a]; *Final Subsequent Environmental Impact Report Santa Clara Valley Water District Stream Maintenance Program Update 2012-2022* [SCVWD 2011a]; SMP post-construction reports [SCVWD 2002b, 2003, 2004, 2005, 2006, 2007, 2008, and 2009]; biological assessment prepared for the SMP [SCVWD 2011b]; *Marsh Studies in South San Francisco Bay: 2005-2008, California Clapper Rail and Salt Marsh Harvey Mouse Survey Report* [H.T. Harvey 2006]); data on special-status species occurrences compiled by the SCVWD since 2001; Rarefind data (CNDDB 2014); aerial photos; and any other relevant information.

2. Within 7 days prior to work within the range of the Salt marsh harvest mouse or California clapper rail, the proposed project area will be surveyed by a qualified biologist to identify specific habitat areas. Surveyed areas will include work locations and access routes. The range of the salt marsh harvest mouse and California clapper rail is based on the SCVWD's GIS mapping reflecting occurrence information and potential habitat. If this mapping is revised, it will be provided to the Service for review.

3. To minimize or avoid the loss of individuals, activities within or adjacent to California

clapper rail and salt marsh harvest mouse habitat will not occur within two hours before or after extreme high tides (6.5 feet or above) when the marsh plain is inundated, because protective cover for those species is limited and activities could prevent them from reaching available cover.

4. Specific habitat areas are vegetated areas of pickleweed (*Sarcocornia pacifica*), alkali heath, (*Frankenia* sp.), and other high marsh vegetation, brackish marsh reaches of channel with heavy accumulations of bulrush thatch (old stands), and high water refugia habitat that may include annual grasses, and shrubs immediately adjacent to channels.

5. Within the identified specific habitat areas, vegetation will be removed by hand from areas to be directly impacted by the work activities if possible (hand removal of vegetation in some channels may not be possible).

6. Prior to the initiation of work each day for all vegetation management work, ground or vegetation disturbance, operation of large equipment, grading, sediment removal, and bank protection work and prior to expanding the work area, if suitable habitat occurs within the immediate work area, a qualified biologist will conduct a pre-construction survey of all suitable habitat that may be directly or indirectly impacted by the day's activities (work area, access routes, staging areas).

7. If during the initial daily survey or during work activities a California clapper rail is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until the California clapper rail leaves the work area.

8. If during the initial daily survey or during work activities a salt marsh harvest mouse or similar rodent is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until a *Site Specific Species Protection Form* can be developed and implemented by a qualified biologist to protect the salt marsh harvest mouse or similar rodent is developed and implemented by the qualified biologist. Acceptable plan activities may include one or more of the following activities: 1) establishment of a buffer zone at least 50 feet in radius from the rodent; 2) ongoing active monitoring, 3) construction of silt fence barrier between maintenance work and location of the rodent, 4) delay of work activity until the qualified biologist can provide CDFW and the Service a suggested course of action and seek concurrence.

9. Mowing using heavy equipment (tractors, boom mowers, rider mowers) will not be conducted in habitat areas or within 50 feet of habitat areas. If mowing with hand equipment is necessary within 50 feet of habitat areas, an on-site monitor will observe the area in front of the mower from a safe vantage point while it is in operation. If salt marsh harvest mouse are detected within the area to be mown, no mowing will occur in that area. If California clapper rail are detected within the area being mowed, the mowing will stop until the individual(s) have left the work area. If visual observation cannot confirm California clapper rail left the work area then it is assumed that the individual(s) remains in the work area, and work will not resume until the area has been thoroughly surveyed (and absence confirmed) or the Service has been contacted for guidance.

BMP ANI-2: Prevent Harm to the Salt Marsh Harvest Mouse and California Clapper Rail

1. No rodenticides or fumigants will be used within the range of the salt marsh harvest mouse or California clapper rail.

2. Methods of rodent control within salt marsh harvest mouse or California clapper rail habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any salt marsh harvest mouse that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.

California Tiger Salamander and California Red-legged Frog

BMP GEN-12: Protection of Special Status Amphibian and Reptile Species

1. An SCVWD qualified biologist will conduct a desk audit to determine whether suitable special-status amphibian habitat is present in or adjacent to a maintenance activity based on all available information including the habitats modeled in the Valley Habitat Plan.

2. If the SCVWD Wildlife or Fisheries Biologist determines that a special-status amphibian could occur in the activity area, a qualified biologist will conduct one daytime and one nighttime survey within a 7 day period preceding the onset of maintenance activities.

3. If a special-status amphibian, or the eggs or larvae of a special status amphibian, are found within the activity area during a pre-activity survey or during project activities, the qualified biologist shall notify the project proponent about the special-status species and conduct the following work specific activities:

    a. For minor maintenance activities and for vegetation removal activities that will take *less* than 1 day, a qualified biologist shall conduct a special status species survey on the morning of and prior to the scheduled work.

        i. If no special status species is found, the work may proceed.

        ii. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed.

        iii. If adults or non-larval juveniles of a special status species are found, one of the following two procedures will be implemented:

            1. If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is less likely to result in adverse effects than leaving the individual in place and rescheduling the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist (with Service and/or CDFW approval, depending on the listing status of the species in question), and work may proceed.

2. If, in the opinion of the qualified biologist, the individual is likely to leave the work area on its own, and work can be feasibly rescheduled, a buffer will be established around the location of the individual(s) and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled.

b. For minor maintenance and vegetation removal activities that will take *more* than 1 day, the qualified biologist shall conduct a special-status species survey on each morning of and prior to the scheduled work commencing.

i. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed.

ii. If adults or non-larval juveniles of a special status species are found, the individual will be captured and relocated by a qualified biologist (with Service and/or CDFW approval, depending on the listing status of the species in question), and work may proceed.

4. For Sediment Removal and Bank Stabilization Projects the wildlife or fisheries biologist in cooperation with the project proponent shall complete a Site Specific Species Protection Form for the project. Elements of the form include: work rescheduling, training work crews, daily surveys, establishment of buffers and buffer fencing, on-site monitoring, habitat modification in advance of work activities, capture and relocation of individual special-status species, methods of documentation, and reporting of results.

a. If no special status amphibian is found within the activity area during a pre-activity survey, the work may proceed.

5. During animal conflict management activities, if special status species are found within a burrow proposed for destruction, a qualified biologist will determine an appropriate buffer distance around that burrow to ensure adequate protection of the habitat. The buffer area may include not destroying adjacent burrows as that may damage subterranean networks of the occupied burrow or produce substrate vibrations which could interfere with prey detection mechanisms. If two consecutive follow up surveys are conducted (spaced 30 days apart) in which the burrow is found to be unoccupied, work can proceed as planned. A naturally found back filled burrow known to have been inhabited by a special-status species will be presumed to still be occupied by that species and a clearly delineated buffer demarcation of the burrow area will be in place for the duration of nearby work activities. In rare instances in which destruction of the burrow is not avoidable during animal conflict management, the animal will be relocated to a safe burrow outside the impact area, with Service and/or CDFW approval, depending on the listing status of the species in question. A biologist will observe the relocated animal until it is certain that the animal is not in immediate danger of desiccation or predation.

Programmatic compensation for adverse effects to threatened or endangered species habitats will be provided by payment of land use fees to the Valley Habitat Plan Implementing Entity or as described below for instances where the Valley Habitat Plan compensation mechanism cannot be utilized. These land use fees will be paid to the Valley Habitat Plan prior to project implementation to cover mitigation of impacts to California tiger salamanders, California red-legged frogs, and least Bell's vireos. Compensation ratios will be applied in instances the Valley Habitat Plan land use fees is not used. In addition to species-specific BMPs, species-targeted habitat conservation will be provided to offset impacts to individual special-status species and their habitats resulting from SMP activities. Prior to maintenance activities each year, anticipated impacts to these species and their habitats will be determined on an activity-by-activity basis by SCVWD staff prior to each year's maintenance activities. Mitigation needs will be summed, and the total mitigation needs for that year will be reported in the Notice of Proposed Work. After the Service provides written concurrence of the anticipated impacts and mitigation approach in the Notice of Proposed Work, the SCVWD will implement habitat conservation to offset that year's impacts prior to those impacts and according to the Service's most current *Section 7 Off-Site Compensation Guidelines*. At the end of each year, the total extent of habitat conservation required, based on that year's impacts, will be determined and compared to that year's compensatory mitigation activities to determine whether any excess mitigation is available as a credit toward future years' mitigation requirements. This information will be documented in the Annual Summary Report. Species-targeted habitat conservation measures are as follows:

California tiger salamander. Habitat conservation will be provided to compensate for unavoidable impacts to California tiger salamanders and their habitat. On an activity-by-activity basis, SCVWD staff will determine the extent of impacts to lands that are both within the potential range of the California tiger salamander and within potentially suitable habitat for the species. If compensation is not provided via payment of fees to the VHP, compensation for these effects will be provided via the protection, enhancement, and management of habitat that currently supports or could support (e.g., based on VHP species modeling) this species at a 3:1 (conservation:impact) ratio, on an acreage basis. Habitat conservation sites and activities must be described in a Habitat Mitigation and Monitoring Plan (HMMP) and approved by the Service in writing. Habitat conservation may include:

1. The preservation, management, and enhancement (e.g., through long-term management targeted toward this species) of high-quality habitat that is already occupied by California tiger salamanders.

2. The restoration or enhancement and preservation of degraded habitat or habitat that is unsuitable for use by California tiger salamanders, but that (1) is in close proximity to areas of known occurrence and (2) could be made more suitable for use via construction of one or more breeding ponds or management to improve the quality and availability of burrows in upland habitat.

California red-legged frog. Habitat conservation will be provided to compensate for unavoidable impacts to California red-legged frogs and their habitat. On an activity-by-activity basis, SCVWD staff will determine the extent of impacts to lands that are both within the potential range of the California red-legged frog and within potentially suitable habitat for the species. If

compensation is not provided via payment of fees to the VHP, compensation for these effects will be provided via the protection, enhancement, and management of habitat that currently supports or could support (e.g., based on VHP species modeling) this species at a 3:1 (conservation : impact) ratio, on an acreage basis. Habitat conservation sites and activities must be described in an HMMP and approved by the Service in writing. Activities which may be suitable for habitat conservation may include:

1. The preservation and management of high-quality habitat that is already occupied by California red-legged frogs.

2. The restoration or enhancement of degraded habitat or habitat that is unsuitable for use by California red-legged frogs, but that (1) is in close proximity to areas of known occurrence and (2) could be made more suitable for use via construction of one or more breeding ponds, enhancement of breeding and non-breeding aquatic habitat via improvements to emergent vegetation or other cover, or management to improve the quality of upland habitat.

California clapper rail and salt marsh harvest mouse. On an activity-by-activity basis, SCVWD staff will determine the extent of impacts from 2014-2023 SMP activities to potentially suitable habitat for the California clapper rail and salt marsh harvest mouse; the SCVWD will obtain Service concurrence of this impact assessment in writing (e.g., via the NPW approval process). The SCVWD estimates approximately 2.0 acres of new impacts in tidal reaches between 2014 and 2023. Less than 2.0 acres of new impacts is located within the range of the Salt Marsh Harvest Mouse or California Clapper Rail. The SCVWD will provide compensation at a 3:1 (compensation : impact) ratio on an acreage basis.

Least Bell's vireo. The SCVWD will provide habitat conservation for its impacts to potential least Bell's vireo habitat. On an activity-by-activity basis, SCVWD staff will determine the extent of impacts to lands that are both within the potential range of the least Bell's vireo and within potentially suitable habitat for the species, as mapped by the VHP, and must have Service concurrence in writing(e.g. via the NPW approval process). Compensation for these effects will be provided in one of three ways:

1. The SCVWD will pay land-use fees to the VHP for impacts to habitat mapped by the VHP as least Bell's vireo habitat.

2. Vegetation management along the banks and benches in any given area mapped as suitable least Bell's vireo habitat by the VHP will occur no more frequently than every 10 years to allow for the regrowth of shrubs and taller forbs, which will provide foraging habitat for least Bell's vireos and other riparian birds. The levee tops will be excluded from this requirement (i.e., vegetation management can occur on the levee tops as needed). These limitations may need to be adapted if they do not maintain sufficient tall, shrub habitat along the edges of the woody riparian corridor to provide suitable least Bell's vireo foraging habitat, or if they produce abnormally dense, stunted growth of willows that is not suitable for use by nesting vireos. If this measure cannot be implemented feasibly, or if the SCVWD elects not to implement this measure, the measure below will be implemented.

3. The SCVWD will create or restore suitable conditions for the least Bell's vireo at a 3:1 ratio on an acreage basis by acquiring land, an easement on land, or permission from landowners along any channels mapped as providing suitable habitat for the least Bell's vireo and otherwise consistent with the VHP, and managing a strip 50 feet wide outside of the woody riparian canopy so that tall forbs and shrubs are able to grow. This strip would be managed so that it is disturbed via mowing every 10 years, with no more than 20% disturbed in a given year, so that suitable conditions are maintained (with the caveat that this management regime may need to be adapted, as described in the preceding paragraph, to ensure that suitable conditions are maintained). If this compensation option is selected, the SCVWD will prepare a HMMP for the compensation site.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Because SMP activities for which the SCVWD is requesting a RGP from the Corps could potentially occur in any area of SCVWD jurisdiction below the 1000-foot contour elevation (with the exception of the Almaden Calero Canal), the Action Area includes any area in which SMP activities could occur along 748.4 miles of channels in the Santa Clara Basin and 264.3 miles of channels in the Pajaro Basin, areas adjacent to or downstream from sites affected, directly or indirectly, by SMP activities, and restoration or enhanced compensation sites.

Analytical Framework for the Jeopardy and Adverse Modification Determinations

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analyses in this biological opinion relies on four components: (1) the *Status of the Species*, which evaluates the California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo's range-wide condition, the factors responsible for that condition, and their survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo's in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo's; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo's; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo's.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy

plover, and least Bell's vireo's current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of these species in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo's and the role of the action area in the survival and recovery of California tiger salamander, California red-legged frog, California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo's as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this biological opinion relies on four components: (1) the *Status of Critical Habitat*, which evaluates the range-wide condition of critical habitat for the California red-legged frog and California tiger salamander in terms of primary constituent elements (PCE)s, the factors responsible for that condition, and the intended recovery function of the critical habitat at the provincial and range-wide scale; (2) the *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units and; (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on the California red-legged frog and California tiger salamander critical habitat are evaluated in the context of the range-wide condition of the critical habitat at the provincial and range-wide scales, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the California red-legged frog and California tiger salamander.

The analysis in this biological opinion places an emphasis on using the intended range-wide recovery function of California red-legged frog and California tiger salamander critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

Status of the Species

California Red-Legged Frog

Listing Status: The California red-legged frog was listed as a threatened species on May 23, 1996 (61 FR 25813) (Service 1996). Critical habitat was designated for this species on April 13, 2006 (71 FR 19244) (Service 2006) and revisions to the critical habitat designation were published on March 17, 2010 (75 FR 12816) (Service 2010). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). A recovery plan was published for the California red-legged frog on September 12, 2002 (Service 2002).

Description: The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 0.6 to 3.1 inches in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Distribution: The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding in Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The species was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002). California red-legged frogs are still locally abundant within portions of the San Francisco Bay area and the Central California Coast. Isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFW 2011).

Status and Natural History: California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger *et al.* 2003, Stebbins 2003). However, they also inhabit ephemeral creeks, drainages and ponds with minimal riparian and emergent vegetation. California red-legged frogs breed from November to April, although earlier breeding records have been reported in southern localities. Breeding generally occurs in still or slow-moving water often associated with emergent vegetation, such as cattails, tules or overhanging willows (Storer 1925, Hayes and Jennings 1988). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto 1984).

Habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer, including vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees (Fellers 2005). Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and includes any landscape feature that provides cover, such as animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial

debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adults are often associated with permanent bodies of water. Some individuals remain at breeding sites year-round, while others disperse to neighboring water features. Dispersal distances are typically less than 0.5-mile, with a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger *et al.* (2003) reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, i.e., California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25-mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment in eastern Contra Costa County, Tatarian (2008) noted that a 57 percent majority of frogs fitted with radio transmitters in the Round Valley study area stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. Her study reported a peak seasonal terrestrial movement occurring in the fall months associated with the first 0.2-inch of precipitation and tapering off into spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the base of trees or rocks, logs, and under man-made structures; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Upland refugia closer to aquatic sites were used more often and were more commonly associated with areas exhibiting higher object cover, e.g., woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to 14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand resulted in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3½ to 7 months following hatching and reach

sexual maturity 2 to 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations can fluctuate from year to year; favorable conditions allow the species to have extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, the animal may temporarily disappear from an area when conditions are stressful (e.g., during periods of drought, disease, etc.).

The diet of California red-legged frogs is highly variable and changes with the life history stage. The diet of the larvae is not well studied, but is likely similar to that of other ranid frogs which feed on algae, diatoms, and detritus by grazing on the surface of rocks and vegetation (Fellers 2005; Kupferberg 1996a, 1996b, 1997). Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific chorus frog, three-spined stickleback and, to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination, feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Threats: Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. Several researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990; Twedt 1993), red swamp crayfish, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle 1976; Barry 1992; Hunt 1993; Fisher and Schaffer 1996). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with California red-legged frog reproduction by eating adult male California red-legged frogs. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; Jennings 1993). Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also affected the threatened amphibian. These declines are attributed to channelization of riparian

areas, enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases may also pose a significant threat, although the specific effects of disease on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson *et al.* 2003). Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson *et al.* 2003; Lips *et al.* 2006). Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric threespine sticklebacks in northwestern California. Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2006). Humans can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e., contaminated boots, waders or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, which results in the listed species being more susceptible to the effects of disease.

Recovery Plan: The recovery plan for the California red-legged frog identifies eight recovery units (Service 2002). The establishment of these recovery units is based on the determination that various regional areas of the species' range are essential to its survival and recovery. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of its range. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations. Thus when combined with suitable dispersal habitat, will allow for the long term viability within existing populations. The management strategy identified within the Recovery Plan will allow for the recolonization of habitats within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

California Red-Legged Frog Critical Habitat

The Service designated critical habitat for the California red-legged frog on April 13, 2006 (Service 2006) and a revised designation to the critical habitat was published on March 17, 2010 (Service 2010). At this time, the Service recognized the taxonomic change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). Critical habitat is defined in Section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) that may require special management considerations or protection and; (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. In determining which areas to designate as critical habitat, the Service considers those physical and biological features that are essential to a species' conservation and that may require special management considerations or protection (50 CFR 424.12(b)). The Service is required to list the known PCEs together with the critical habitat description. Such physical and biological features include, but are not limited to, the following: (1) space for individual and population growth, and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, rearing of offspring, or dispersal and; (5) generally, habitats that are

protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

The PCEs defined for the California red-legged frog were derived from its biological needs. The area designated as revised critical habitat provides aquatic habitat for breeding and non-breeding activities and upland habitat for shelter, foraging, predator avoidance, and dispersal across its range. The PCEs and, therefore, the resulting physical and biological features essential for the conservation of the species were determined from studies of California red-legged frog ecology. Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, the Service determined that the PCEs essential to the conservation of the California red-legged frog are:

(1) aquatic breeding habitat defined as standing bodies of fresh water (with salinities less than 7.0 parts per thousand), including: natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years;

(2) non-breeding aquatic habitat defined as freshwater and wetted riparian habitats, as described above, that may not hold water long enough for the subspecies to hatch and complete its aquatic life cycle but that do provide for shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult California red-legged frogs. Other wetland habitats that would be considered to meet these elements include, but are not limited to: plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period;

(3) upland habitat defined as upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mile in most cases and comprised of various vegetational series such as grasslands, woodlands, wetland, or riparian plant species that provides the frog shelter, forage, and predator avoidance. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the wetland or riparian habitat. These upland features contribute to the filling and drying of the wetland or riparian habitat and are responsible for maintaining suitable periods of pool inundation for larval frogs and their food sources, and provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), as well as small mammal burrows and moist leaf litter and; (4) dispersal habitat defined as accessible upland or riparian dispersal habitat within designated units and between occupied locations within a minimum of 1 mile of each other and that allows for movement between such sites. Dispersal habitat includes various natural habitats and altered habitats such as agricultural fields, which do not contain barriers (e.g., heavily traveled road without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large reservoirs over 50 acres in size, or other areas that do not contain those features identified in PCEs 1, 2, or 3 as essential to the conservation of the subspecies.

With the revised designation of critical habitat, the Service intends to conserve the geographic areas containing the physical and biological features that are essential to the conservation of the species, through the identification of the appropriate quantity and spatial arrangement of the PCEs sufficient to support the life-history functions of the species. Not all life-history functions require all the PCEs and not all areas designated as critical habitat will contain all the PCEs. Refer to the final designation of critical habitat for California red-legged frog for additional information (Service 2010).

Central California Tiger Salamander

Listing Status: On May 23, 2003, we proposed to list the Central Distinct Population Segment (DPS) of California tiger salamander as threatened. At that time, we also proposed reclassification of the Santa Barbara County DPS and Sonoma County DPS from endangered to threatened (68 FR 28647). In the same notice, we also proposed a special rule under section 4(d) of the Act to exempt take for routine ranching operations for the Central California DPS and, if reclassified to threatened, for the Santa Barbara and Sonoma County DPSs (68 FR 28668). On August 4, 2004, after determining that the listed Central DPS of the Central California tiger salamander was threatened (69 FR 47211), we determined that the Santa Barbara and Sonoma County populations were threatened as well, and reclassified the California tiger salamander as threatened throughout its range (69 FR 47212), removing the Santa Barbara and Sonoma County populations as separately listed DPSs (69 FR 47241). In this notice, we also finalized the special rule to exempt take for routine ranching operations for the Central California tiger salamander throughout its range (69 FR 47248).

On August 18, 2005, as a result of litigation of the August 4, 2004, final rule on the reclassification of the California tiger salamander DPSs (Center for Biological Diversity et al. v. United States Fish and Wildlife Service et al., C 04-04324 WHA (N.D. Cal. 2005), the District Court of Northern California sustained the portion of the 2004 rule pertaining to listing the Central California tiger salamander as threatened with a special rule, but vacated the portion of the 2004 rule that re-classified the Santa Barbara and Sonoma DPSs to threatened status thereby reinstating their status as endangered. On August 31, 2011, the List of Endangered and Threatened Wildlife in part 17, subchapter B of Chapter I, title 50 of the Code of Federal Regulations (CFR) was amended to reflect the vacatures contained in the 2005 court order, classifying the Santa Barbara DPS and the Sonoma DPS of the California tiger salamander as endangered, and the Central DPS of the California tiger salamander as threatened with a special rule to exempt routine ranching operations from take (Service 2011b). In this same notice, the Service revised the designation of critical habitat for the Sonoma County DPS.

Species Description: The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Recorded adult measurements have been as much as 8.2 inches long (Petranka 1998; Stebbins 2003). California tiger salamanders exhibit sexual dimorphism (differences in body appearance based on gender) with males tending to be larger than females. The coloration of the adults generally consists of random white or yellowish markings against a black body. The markings tend to be more concentrated on the lateral sides of the body; whereas other salamander species tend to have brighter yellow spotting that is heaviest on the dorsal surface.

Distribution: The California tiger salamander is endemic to California and historically inhabited the low-elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and Inner Coast Ranges (Jennings and Hayes 1994; Storer 1925; Shaffer *et al.* 1993). The species has been recorded from near sea level to approximately 3,900 feet in the Coast Ranges and to approximately 1,600 feet in the Sierra Nevada foothills (Shaffer and Trenham 2004). Along the Coast Ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County.
The Central California tiger salamander occupies the Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties), Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeastern Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties), southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings Counties), and the Central Coast Range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties).

Life History: The California tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although the larvae develop in the vernal pools and ponds in which they were born, the species is otherwise terrestrial and spend most of their post-metamorphic lives in widely dispersed underground retreats (Shaffer *et al.* 2004; Trenham *et al.* 2001). Because they spend most of their lives underground, the animals rarely are encountered even in areas where California tiger salamanders are abundant. Subadult and adult California tiger salamanders typically spend the dry summer and fall months in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (Storer 1925; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a). Although ground squirrels have been known to eat these amphibians, the relationship with their burrowing hosts is primarily commensal (an association that benefits one member while the other is not affected) (Loredo *et al.* 1996; Semonsen 1998). California tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for the amphibians. Underground refugia also provide protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although California tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. California tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia for the species. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredo *et al.* 1996).

Upland burrows inhabited by California tiger salamanders have often been referred to as aestivation-sites. However, "aestivation" implies a state of inactivity, while most evidence suggests that the animals remain active in their underground dwellings. One study has found that salamanders move, feed, and remain active in their burrows (Van Hattem 2004). Because adults arrive at breeding ponds in good condition and are heavier when entering the pond than when leaving, researchers have long inferred that they are feeding while underground. A number of direct observations have confirmed this (Trenham 2001; Van Hattem 2004). Thus, "upland habitat" is a more accurate description of the terrestrial areas used by California tiger salamanders.

California tiger salamanders typically emerge from their underground refugia at night during the fall or winter rainy season (November-May) to migrate to their breeding ponds (Stebbins 1985, 1989; Shaffer *et al.* 1993; Trenham *et al.* 2000). The breeding period is closely associated with the rainfall patterns in any given year with less adults migrating and breeding in drought years (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Male California tiger salamander are typically first to arrive and generally remain in the ponds longer than females. Results from a 7-year study in Monterey County suggested that males remained in the breeding ponds for an average of 44.7 days while females remained for an average of only 11.8 days (Trenham *et al.* 2000). Historically, breeding ponds were likely limited to vernal pools, but now include livestock stock ponds. Ideal breeding ponds are typically fishless, free of non-native predators, and seasonal or semi-permanent (Barry and Shaffer 1994; Petranka 1998).

While in the ponds, adult California tiger salamanders mate and then the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Egg laying typically reaches a peak in January (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). Eggs are often attached to objects, such as rocks and boards in ponds with no or limited vegetation (Jennings and Hayes 1994). Clutch sizes from a Monterey County study had an average of 814 eggs (Trenham *et al.* 2000). Seasonal pools may not exhibit sufficient depth, persistence, or other necessary parameters for adult breeding during times of drought (Barry and Shaffer 1994). After breeding and egg laying is complete, adults leave the pool and return to their upland refugia (Loredo *et al.* 1996; Trenham 1998a). Adult California tiger salamanders often continue to emerge nightly for approximately the next two weeks to feed amongst their upland habitat (Shaffer *et al.* 1993).

California tiger salamander larvae typically hatch within 10 to 24 days after eggs are laid (Storer 1925). The larvae are totally aquatic and range in length from approximately 0.45 to 0.56 inches (Petranka 1998). They have yellowish gray bodies, broad fat heads, large, feathery external gills, and broad dorsal fins that extend well up their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume the tadpoles of Pacific tree frogs, western spadefoot toads, and California red-legged frogs (J. Anderson 1968; P. Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems. When not feeding, they often rest on the bottom in shallow water but are also found throughout the water column in deeper water. Young California tiger salamanders are wary and typically escape into vegetation at the bottom of the pool when approached by potential predators (Storer 1925).

The California tiger salamander larval stage is typically completed in 3 to 6 months with most metamorphs entering upland habitat during the summer (Petranka 1998). In order to be successful, the aquatic phase of this species' life history must correspond with the persistence of its seasonal aquatic habitat. Most seasonal ponds and pools dry up completely during the summer. Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973). Larval development and metamorphosis can vary and is often site-dependent. Larvae collected near Stockton in the Central Valley during April varied between 1.88 to 2.32 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left breeding pools 60

to 94 days after eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. Longer ponding duration typically results in larger larvae and metamorphosed juveniles that are more likely to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). Larvae will perish if a breeding pond dries before metamorphosis is complete (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation between ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 sampled pools supported larval salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only 6 (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998).

Following metamorphosis, juvenile California tiger salamanders leave their pools and move to upland habitat. This emigration can occur in both wet and dry conditions (Loredo and Van Vuren 1996; Loredo *et al.* 1996). Wet conditions are more favorable for upland travel but summer rain events seldom occur as metamorphosis is completed and ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under dry conditions, juveniles may be limited to seeking upland refugia in close proximity to their aquatic larval pool. These individuals often wait until the next winter's rains to move further into more suitable upland refugia. The peak emergence of these metamorphs in ponds is typically between mid-June and mid-July (Loredo and Van Vuren 1996; Trenham et al. 2000). Juveniles remain active in their upland habitat, emerging from underground refugia during rainfall events to disperse or forage (Trenham and Shaffer 2005). Depending on location and other development factors, metamorphs will not return as adults to aquatic breeding habitat for 2 to 5 years (Loredo and Van Vuren 1996; Trenham *et al.* 2000).

Reproductive success for the California tiger salamander is low. Results from one study suggest that the average female bred 1.4 times over their lifespan and produced 8.5 young per reproductive effort that survived to metamorphosis (Trenham *et al.* 2000). This resulted in the output of roughly 11 metamorphic offspring over a breeding female's lifetime. The primary reason for low reproductive success may be that this relatively short-lived species requires two or more years to become sexually mature (Shaffer *et al.* 1993). Some individuals may not breed until they are 4 to 6 years old. While California tiger salamanders may survive for more than 10 years, many breed only once, and in one study, less than 5 percent of marked juveniles survived to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well human-caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Dispersal and migration movements made by California tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/ birth pond to breed, while 20 percent dispersed to other ponds (Trenham *et al.* 2001). After breeding, adult California tiger salamanders return to upland habitats, where they may live for one or more years before

attempting to breed again (Trenham *et al.* 2000).

California tiger salamanders are known to travel long distances between breeding ponds and their upland refugia. Generally it is difficult to establish the maximum distances traveled by any species, but salamanders in Santa Barbara County have been recorded dispersing up to 1.3 miles from their breeding ponds (Sweet 1998). As a result of a 5-year capture and relocation study in Contra Costa County, Orloff (2011) estimated that captured California tiger salamanders were traveling a minimum of 0.5 miles to the nearest breeding pond and that some individuals were likely traveling more than 1.3 miles to and from breeding ponds. California tiger salamanders are also known to travel between breeding ponds. One study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at other ponds approximately 1,900 and 2,200 feet away (Trenham *et al.* 2001). In addition to traveling long distances during juvenile dispersal and adult migration, salamanders may reside in burrows far from their associated breeding ponds.

Although previously cited information indicates that California tiger salamanders can travel long distances, they typically remain close to their associated breeding ponds. A trapping study conducted in Solano County during the winter of 2002/2003 suggested that juveniles dispersed and used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More juvenile California tiger salamanders were captured in traps placed at 328, 656, and 1,312 feet from a breeding pond instead of 164 feet. Approximately 20 percent of the captured juveniles were found at least 1,312 feet from the nearest breeding pond. The associated distribution curve suggested that 95 percent of juvenile California tiger salamanders were within 2,099 feet of the pond, with the remaining 5 percent being found at even greater distances. Preliminary results from the 2003-04 trapping efforts at the same study site detected juvenile California tiger salamanders at even further distances, with a large proportion of the captures at 2,297 feet from the breeding pond (Trenham 1998a). Surprisingly, most juveniles captured, even those at 2,100 feet, were still moving away from ponds. In Santa Barbara County, juvenile Santa Barbara County DPS California tiger salamanders have been trapped approximately 1,200 feet away while dispersing from their natal pond (Science Applications International Corporation, unpublished data). This data shows that many California tiger salamanders travel far while still in the juvenile stage. Post-breeding movements away from breeding ponds by adults appear to be much smaller. During post-breeding emigration from aquatic habitat, radio-equipped adult California tiger salamanders were tracked to burrows between 62 to 813 feet from their breeding ponds (Trenham 2001). These reduced movements may be due to adult California tiger salamanders exiting the ponds with depleted physical reserves, or drier weather conditions typically associated with the post-breeding upland migration period.

California tiger salamanders are also known to use several successive burrows at increasing distances from an associated breeding pond. Although previously cited studies provide information regarding linear movement from breeding ponds, upland habitat features appear to have some influence on movement. Trenham (2001) found that radio-tracked adults were more abundant in grasslands with scattered large oaks, than in more densely wooded areas. Based on radio-tracked adults, there is no indication that certain habitat types are favored as terrestrial movement corridors (Trenham 2001). In addition, captures of arriving adults and dispersing new metamorphs were evenly distributed around two ponds completely encircled by drift fences and pitfall traps. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Threats: The Central California tiger salamander is imperiled throughout its range due to a variety of human activities (Service 2004). Current factors associated with declining Central California tiger salamander populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the non-native eastern tiger salamander (*Ambystoma tigrinum*) (Fitzpatrick and Shaffer 2004; Riley *et al.* 2003); and predation by introduced species. Central California tiger salamander populations are likely threatened by multiple factors but continued habitat fragmentation and colonization of non-native salamanders may represent the most significant current threats. Habitat isolation and fragmentation within many watersheds have precluded dispersal between sub-populations and threatened the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or "rescuing" extirpated habitat patches). Other threats include disease, predation, interspecific competition, urbanization and population growth, exposure to contaminants, rodent and mosquito control, road-crossing mortality, and hybridization with non-native salamanders. Currently, these various primary and secondary threats are largely not being offset by existing Federal, State, or local regulatory mechanisms. The Central California tiger salamander is also prone to chance environmental or demographic events, to which small populations are particularly vulnerable.

California Tiger Salamander Critical Habitat

Critical habitat was designated on August 23, 2005 in 19 counties for the Central Valley population and is divided into four geographic regions: (1) Central Valley Region; (2) Southern San Joaquin Region; (3) East Bay Region; and (4) Central Coast Region (70 FR 49379). The rule identifies approximately 199,109 acres (80,576 hectares) within 32 critical habitat units.

The primary constituent elements for the tiger salamander are based on our current knowledge of the life history, biology, and ecology of the species and the relationship of its essential life history functions to its habitat, we have determined that the Central population of the tiger salamander requires the following primary constituent elements:

(1) *Primary Constituent Element 1:* The requisite aquatic habitat described as the first PCE is essential for the Central population of the tiger salamander for providing space, food, and cover necessary to support reproduction and to sustain early life history stages of larval and juvenile tiger salamander. Aquatic and breeding habitats consist of fresh water bodies, including natural and artificially made (e.g., stock) ponds, vernal pools, and vernal pool complexes. To be considered essential, aquatic and breeding habitats must have the capability to hold water for a minimum of 12 weeks in the winter or spring in a year of average rainfall, the amount of time needed for salamander larvae to metamorphose into juveniles capable of surviving in upland habitats. During periods of drought or less-than-average rainfall, these sites may not hold water long enough for individuals to complete metamorphosis; however, these sites would still be considered essential because they constitute breeding habitat in years of average rainfall.

(2) *Primary Constituent Element 2:* Essential upland habitats containing underground refugia described as the second PCE are essential for the survival of the Central population's adult tiger salamanders and juveniles that have recently undergone metamorphosis. Adult and juvenile tiger salamanders are primarily terrestrial; adult tiger salamanders enter aquatic habitats only for relatively short periods of time to breed. For

the majority of their life cycle, tiger salamanders survive within upland habitats containing underground refugia in the form of small mammal burrows. The Central population of the tiger salamander cannot persist without upland underground refugia. These underground refugia provide protection from the hot, dry weather typical of California in the nonbreeding season. The Central population of the tiger salamander also forages in the small mammal burrows and rely on the burrows for protection from predators. The presence of small burrowing mammal populations is essential for constructing and maintaining burrows. Without the continuing presence of small mammal burrows in upland habitats, the tiger salamander would not be able to survive.

(3) *Primary Constituent Element 3:* The dispersal habitats described as the third PCE are essential for the conservation of the Central population of the tiger salamander. Protecting the ability of tiger salamander to move freely across the landscape in search of suitable aquatic and upland habitats is essential in maintaining gene flow, recolonization, and population structure. Movement between areas containing suitable upland and aquatic habitats (i.e., dispersal) is restricted due to inhospitable conditions around and between areas of suitable habitats. Because many of the areas of suitable habitats may be small and support small numbers of salamanders, local extinction of these small units may be common.

Essential dispersal habitats generally consist of upland areas adjacent to essential aquatic habitats that are not isolated from essential aquatic habitats by barriers that tiger salamanders cannot cross. Essential dispersal habitats provide connectivity among suitable aquatic and upland habitats. While the tiger salamanders can bypass many obstacles, and do not require a particular type of habitat for dispersal, the habitats connecting essential aquatic and upland habitats need to be free of barriers (e.g., a physical or biological feature that prevents salamanders from dispersing beyond the feature) to function effectively. Examples of barriers are areas of steep topography devoid of soil or vegetation. Agricultural lands such as row crops, orchards, vineyards, and pastures do not constitute barriers to the dispersal of tiger salamander.

The proposed project is located within the East Bay Geographic Region, which covers portions of Alameda County, south to Santa Benito and Santa Clara counties, and west to the eastern portions of San Joaquin and Merced Counties. The East Bay Region includes 14 critical habitat units totaling approximately 68,873 acres (27,872 hectares). The 14 critical habitat units within the East Bay Region occur in the Livermore, Central Coast, and San Joaquin vernal pool regions. Special management requirements for these units include management of erosion and sedimentation, pesticide application, introduction of predators such as bullfrogs and mosquito fish, disturbance activities associated with development that may alter the hydrologic functioning of the aquatic habitat, upland disturbance activities that may alter upland refugia and dispersal habitat, and activities such as road development and widening that may develop barriers for dispersal.

California Clapper Rail

Refer to the *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California.* (Service 2013) for the species status.

Salt Marsh Harvest Mouse

Refer to the *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California.* (Service 2013) for the species status.

California Least Tern

Refer to the five-year review (Service 2006) for the species status.

Snowy Plover

Refer to the *Recovery Plan for the Pacific Coast Population of the Western Snowy Plover* (Service 2007) for the species status.

Least Bell's Vireo

Refer to the five-year review (Service 2006) and Santa Clara Valley Habitat Plan (ICF 2012) for the species status.

Environmental Baseline

The Service issued a section 10(a)(1)(B) incidental take permit for the Santa Clara Valley Habitat Plan. Covered species in the Santa Clara Valley Habitat Plan also analyzed in this biological opinion include the California red-legged frog, California tiger salamander, and least Bell's vireo. The majority of the SMP action area for these species falls within the 460,205 acre Santa Clara Valley Habitat Plan Permit Area. Covered Activities include Urban Development, In-stream Capital Projects, In-stream Operations and Maintenance, Rural Capital Projects, Rural Operation and Maintenance, Rural Development, and Conservation Strategy Implementation and will occur within a 50 year time period. Due to the programmatic nature of the Santa Clara Valley Habitat Plan, the baseline for these species are based on habitat models and supplemented by CNDDB occurrence data. The SMP analysis described in this biological opinion is intended to be consistent with the methods of the Santa Clara Valley Habitat Plan.

The following information was largely taken from the July 2011 Biological Assessment for the SMP (SCVWD 2011a), the December 2011 Final Subsequent Environmental Impact Report Santa Clara Valley Water District Stream Maintenance Program Update 2012-2022 (SCVWD 2011b), January 2012 supplement to the Biological Assessment, and the August 30, 2012 *Draft BO sections for FWS.*

California Red-legged Frog

Primary habitat includes breeding and foraging habitat including riverine, coastal and valley freshwater marshes, riparian forest/woodland wetlands, ponds (excluding percolation ponds), and agriculture land cover types are considered potential breeding and foraging habitat (ICF 2012). Secondary habitat includes movement and refugia in grassland, chaparral and coastal scrub, oak woodland, riparian forest/scrub, and conifer woodland land cover types within 100 feet of primary habitat and are characterized as upland refugia (ICF 2012). Grassland, chaparral and coastal scrub, oak woodland, riparian forest/scrub, conifer woodland, and agriculture land cover

types beyond 100 feet but within 2 miles of primary habitat are characterized as dispersal habitat (ICF 2012). The Action Area potentially supports three California red-legged frog essential behaviors, breeding, foraging, and dispersal. California red-legged frogs could potentially breed and be present in channels where SMP activities occur.

California red-legged frogs are entirely absent from the urbanized valley floor in the northern part of the Action Area (SCVWD 2011). California red-legged frogs are adversely affected throughout the valley floor south of urban San Jose by intensive agricultural and urban development which have eliminated breeding populations (SCVWD 2011). Since 2004, SCVWD biologists have conducted pre-activity surveys for California red-legged frogs along hundreds of miles of stream for SMP projects and capital projects in accordance with the SCVWD's BMPs, and have not found a California red-legged frog (SCVWD 2011). Protocol surveys have not been performed in these areas in most cases.

Extant breeding populations of red-legged frogs may be limited to the periphery of the Action Area. California red-legged frogs have been recorded in the upper reaches of several streams that flow into the Action Area, such as Saratoga, Calabazas, Guadalupe, and Upper Penitencia creeks (SCVWD 2011).

California red-legged frogs potentially could breed in streams where SMP activities are projected. This species is known from very few locations below the reservoirs along the major SMP streams, and the abundance of non-native fish predators along these stream reaches likely adversely affects red-legged frog breeding populations along these reaches (SCVWD 2011).

Within projected SMP activity areas where red-legged frogs may occur, they are expected to make the greatest use of the aquatic channels and the riparian habitat immediately adjacent to the channel (SCVWD 2011). They may forage or take refuge anywhere in the riparian habitats along these channels, and in areas with managed levees, use of drier, more open areas is expected to occur at least during dispersal (SCVWD 2011).

Threats include removal and alteration of habitat due to urbanization, overgrazing of aquatic and riparian habitats, and predation by nonnative species. Activities that can degrade habitat include agriculture, mining, recreation, timber harvesting, nonnative plants, impoundments, water diversions, degraded water quality, and poorly managed infrastructure maintenance activities (ICF 2012). Habitat along many stream courses has been isolated and fragmented, resulting in reduced connectivity between populations and lowered dispersal opportunities (ICF 2012).

California Red-legged Frog Critical Habitat

Critical habitat for the California red-legged frog was most recently designated in 2010 (Service 2010a). California red-legged frog critical habitat units STC-1 and STC-2 occur within and near the Action Area. These critical habitat units occur near the northwestern end of Anderson Reservoir, along Highway 152 east of Gilroy, and elsewhere along the foothills of the Diablo Range. The Action Area supports four PCEs for the California red-legged frog: (1) aquatic breeding habitat, (2) aquatic non-breeding habitat, (3) upland habitat, and (4) dispersal habitat.

California Tiger Salamander

Potential breeding and foraging habitat is assumed to be all ponds (excluding percolation ponds), coastal and valley freshwater marshes, natural lakes, and seasonal wetlands within riparian,

grassland, oak woodland, and conifer woodland land cover types (ICF 2012). Upland refugia and dispersal habitat are assumed to be within 1.3 miles of primary habitat in grassland, chaparral and coastal scrub, oak woodland, riparian forest/scrub, riparian forest/woodland wetlands, conifer woodlands, and agricultural areas (ICF 2012).

Historically, the California tiger salamander likely occurred in a number of locations within the Action Area. Filling or draining of ponds and development of upland habitat has reduced suitable habitat conditions. The species has been largely affected in the valley floor (H. T. Harvey & Associates 1999). They are likely absent from the majority of the urbanized valley floor in the northern part of the Action Area. One known exception is a single population near Communications Hill in south San Jose. California tiger salamanders are also are adversely affected in the majority of the valley floor south of the urban San Jose area, where intensive agricultural and urban development has eliminated breeding populations. Breeding sites are known at the edges of Coyote Valley (e.g., south of Bailey Avenue and west of Santa Teresa Boulevard), where ponds are located close to relatively undisturbed grasslands at the base of the foothills.

Coyote Canal, Coyote Canal Extension, and Coyote Alamitos Canals are not currently operational, and thus are not subject to fast flows. Thus, there is potential for these canals to serve as potential breeding habitat for California tiger salamanders. California tiger salamanders are expected to occur within the SMP's activity areas during upland dispersal or within upland refugia such as small mammal burrows.

Populations in the Action Area also occur in areas with seasonal pools and stock ponds adjacent to the Action Area, particularly in the less heavily developed areas and areas that have not been heavily cultivated.

California Tiger Salamander Critical Habitat

The following designated California tiger salamander critical habitat units occur within or near the Action Area: Unit 3 east of Calaveras Reservoir, Unit 5 northeast of Cherry Flat Reservoir, Unit 6 along Mt. Hamilton Road, Unit 7 near the northwestern end of Anderson Reservoir, Unit 8 located around Calero Reservoir; Unit 9 southwest of Coyote Reservoir; Units 10a and 10b west/southwest of San Martin; Unit 11 at the southern end of Henry Coe State Park, and Unit 12 along Highway 152 east of Gilroy. The Action Area supports three PCEs for the California tiger salamander: (1) standing bodies of freshwater ponds, vernal pools, and other ephemeral or permanent water bodies, (2) upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other underground habitat, and (3) accessible upland dispersal habitat between occupied locations.

California Clapper Rail

Breeding-season surveys of South Bay marshes for clapper rails through the early 1990s, summarized by Foin et al. (1997), indicated that the most substantial populations of clapper rails in the South Bay were, predictably, in the largest sections of tidal salt marsh: at Mowry Marsh and Dumbarton Marsh (in the East Bay between the Dumbarton Bridge and Mowry Slough), at the Faber/Laumeister Tracts and other marshes in the Palo Alto/East Palo Alto area, and at Greco Island in Redwood City. Clapper rails occurred in many other marshes as well, including Ideal Marsh (adjacent to Cargill pond N5), Calaveras Marsh (adjacent to Cargill Ponds M2 and M3),

and Triangle Marsh in Alviso. Surveys by H. T. Harvey & Associates and others since the early 1990s, have documented clapper rails in a number of areas near the SMP Action Area, including lower San Francisquito Creek; the Palo Alto Baylands; Hook's Isle; the mouth of Charleston Slough; lower Permanente and Stevens creeks; Guadalupe Slough (primarily from its confluence with Moffett Channel downstream); Alviso Slough; a number of locations along Coyote Slough, extending upstream through the reach of the slough between Newby Island Landfill and the San Jose-Santa Clara Water Pollution Control Plant (known as South Coyote Slough or the lower Coyote Creek Bypass); and in the Warm Springs marshes.

Projected SMP activities near potential California clapper rail breeding and foraging habitat are located along San Francisquito Creek downstream from U.S. 101, at the confluence of Moffett Channel and Guadalupe Slough, and along South Coyote Slough (along the northeastern edge of Pond A18). Projected SMP activities near habitat that may be used for foraging by clapper rails, but where breeding is not expected to occur, are located along Moffett Channel and Guadalupe Slough upstream from their confluence, lower Calabazas and San Tomas Aquinas Creeks north of Highway 237, upper Alviso Slough between the Alviso Marina and Gold Street.

Salt Marsh Harvest Mouse

Within the Action Area, salt marsh harvest mice are known from a variety of locations in the South Bay, especially from the tidal salt marshes of the Bay, levees, and from a series of diked salt marshes (H. T. Harvey & Associates 2010b). Vegetation management activities are projected in areas adjacent to suitable habitat for the salt marsh harvest mouse, including along the levees of Moffett Channel, Guadalupe Slough, Coyote Creek Bypass and South Coyote Slough, Coyote Slough, Coyote Creek, Newby Island, and the mouth of San Francisquito Creek. Sediment removal activities are not projected to occur within habitat of the salt marsh harvest mouse. The areas where sediment removal is projected closest to potential habitat for these species are on Lower Penitencia Creek upstream from Interstate 880 near Dixon Landing Road and on lower Guadalupe River upstream from Gold Street. Along these streams, Interstate 880 and Gold Street, respectively, were determined conservatively to be the uppermost extent of potential habitat for these species.

California Least Tern

California least terns do not breed in or adjacent to the Action Area and has never been recorded nesting in Santa Clara County. However, managed ponds in the Mountain View/Sunnyvale/Alviso area serve as an important post-breeding area in late summer and early fall. Both adult and juvenile least terns roost on saline managed pond levees (both outboard levees and interior levees between ponds) and boardwalks, and forage both in the saline managed ponds and over the open waters of the Bay. In recent years, the post-breeding (late summer/fall) staging area for least terns in the South Bay has been in the complex of saline managed ponds immediately north of Moffett Field (Ponds AB1, A2E, and AB2). This site is used predictably for roosting and foraging by both adult and juvenile least terns in July and August each year, with typical counts of 20 to 100 birds. Least terns have also been recorded at a number of other ponds in the Action Area, including A5, A7, A9, A10, A11, and A14 (SCVWD 2011a).
Relative to SMP activity areas, least terns may forage in managed ponds adjacent to levees that may be managed by the SCVWD, such as those along Permanente and Stevens creeks and Guadalupe, Alviso, and Coyote sloughs. However, no SMP activities are projected in proximity

to known roosting or staging areas in the ponds immediately north of Moffett Field, and least terns are not typically seen foraging in the sloughs themselves.

Snowy Plover

In the South Bay, the highest numbers of nesting snowy plovers occur in portions of Alameda and San Mateo counties, outside the SMP Action Area. Until recently, the area within Santa Clara County that consistently supported the highest numbers of nesting snowy plovers was Pond A8, located between Alviso and Guadalupe sloughs just west of the town of Alviso (Ryan and Parkin 1998, Strong 2004). However, that pond has been flooded as part of Phase 1 of the South Bay Salt Ponds Restoration Project, and its managed depth will no longer allow for the exposure of salt panne and island habitat suitable for plover nesting. Similarly, Pond A6 (located between the mouths of Alviso and Guadalupe sloughs) previously supported low numbers of nesting snowy plovers, but it was recently breached as part of the South Bay Salt Ponds Restoration Project and thus no longer provides suitable breeding habitat.

The areas that have supported nesting snowy plovers in recent years, and that still provide suitable conditions for nesting, are portions of New Chicago Marsh providing salt panne habitat and an impoundment between pond A12 and New Chicago Marsh. During the 2009 breeding season, seven western snowy plover nests were located in the Alviso complex, including one snowy plover nest in Pond A8, one in the impoundment, and five nests in New Chicago Marsh (SFBBO 2009). Snowy plovers also nested in the late 1990s in Pond A3N, on the southwest side of the mouth of Guadalupe Slough (SCVWD 2011a). Adjacent Refuge land is managed to provide nesting habitat for snowy plovers and other pond-associated waterbirds, such as maintaining low water levels in Pond A12 (immediately north/northwest of the Alviso Marina) to provide salt flats and islands, and plovers are likely to nest in this pond. The large flood-control levees with extensive vegetation on their banks, such as the ones lining sloughs within the Action Area, are not used for nesting.

The areas in Santa Clara County that have supported nesting snowy plovers in recent years, and that still provide suitable conditions for nesting, are islands on pond A12 (just north/northwest of the Alviso Marina), portions of New Chicago Marsh providing salt panne habitat, and a small impoundment between pond A12 and New Chicago Marsh. Non-breeding individuals may occasionally forage in the San Jose-Santa Clara Water Pollution Control Plant sludge ponds, or possibly at the Coyote Creek Reach 1A waterbird pond, both of which are very close to projected SMP activities.

No SMP activities are currently projected to occur in or very close to areas that support nesting snowy plovers. However, this species can select breeding areas opportunistically, and it is possible that changes in habitat during the period 2012-2022 could result in use of new areas by breeding plovers. For example, if management of ponds adjacent to projected SMP activities (such as Pond A4 between Moffett Channel and Guadalupe Slough, or Pond A18 adjacent to South Coyote Slough) changes so that these ponds become suitable for nesting, then plovers may nest in areas adjacent to projected SMP activities. Likewise, if activities such as vegetation management or management of animal conflicts need to occur in non-projected areas, such as segments of Alviso Slough along Pond A12, then SMP activities could occur adjacent to snowy plover nesting and foraging habitat.

Least Bell's Vireo

In the past several years, populations of least Bell's vireos have begun to rebound due to intensive recovery efforts (Kus 2002, Service 2006b). There have been only three records from Santa Clara County since 1932. Beginning in 1997, the SCVWD has conducted least Bell's vireo surveys almost annually along lower Llagas Creek, and occasionally along sections of Uvas Creek, during the breeding season (Padley 2010, H. T. Harvey & Associates 2010a). A pair was detected in April and May 1997, and two singing males were reported on 17 May 2001 (Rottenborn 2007); both of these records were from lower Llagas Creek between Highway 152 and the confluence with the Pajaro River, just east of Gilroy. A single male was heard singing along Coyote Creek near the Coyote Creek Golf Course on 20 June 2006 (H. T. Harvey & Associates, unpublished). This individual was looked for but not relocated subsequently. Within the SMP Action Area, least Bell's vireos are expected to breed along streams in the Pajaro Basin. Portions of lower Llagas Creek (downstream from Highway 152), the Pajaro River (from Llagas Creek downstream), and lower Uvas/Carnadeo Creek (downstream from Hecker Pass Road) provide suitable habitat for the species, and SMP activities are projected in these areas. Protocol-level surveys for the species were conducted along Uvas Creek between Hecker Pass Road and Santa Teresa Boulevard in 2006 (H. T. Harvey & Associates, unpublished data) and along portions of Uvas/Carnadero Creek, the Pajaro River, Tar Creek, and other waterways along U.S. 101 south of Gilroy in 2007 (H. T. Harvey & Associates 2011), with negative results. Potential habitat for the species is also present in the Action Area along lower Pacheco Creek, though no SMP activities are projected in that area.

Effects of the Proposed Action

The effects of the Proposed Action on each individual species are described below. Potential habitat for multiple species may occur within the same area (e.g., a single maintenance activity may be determined to impact the California tiger salamander, California red-legged frog, and least Bell's vireo all in the same footprint). Due to the overlap in impacts among species within a given area, the total impact acreage (e.g. for which compensation will be provided) does not equal the sum of the impacts to each individual species.

California Tiger Salamander and California Red-legged Frog

Direct effects on California tiger salamanders and California red-legged frogs as a result of the Proposed Action would include injury or mortality from being crushed by equipment, maintenance materials, and worker foot traffic. These effects would be reduced by the avoidance and minimization measures proposed by the SCVWD, including minimizing and clearly demarcating the boundaries of SMP activity areas.

Relocating California tiger salamanders and California red-legged frogs out of harm's way, as proposed, may further reduce injury or mortality. However, injury or mortality of California tiger salamanders and California red-legged frogs may occur as a result of improper handling, containment, or transport of individuals, or from releasing them into unsuitable habitat (e.g., where exotic predators are present).

The possible spread of chytrid fungus or other pathogens would be minimized by following the Declining Amphibian Populations Task Force's Fieldwork Code of Practice, in conjunction with

the use of a qualified biologist to reduce or prevent improper handling, containment, or transport of California tiger salamanders and California red-legged frogs. These measures have been included in the conservation measures for the California tiger salamander and California red-legged frog described above.

Work activities, including noise and vibration, may cause California tiger salamanders and California red-legged frogs to leave the work area. This disturbance may increase the potential for individual frogs to become victims of predation and/or desiccation. Minimizing the area disturbed by SMP activities will reduce the potential for fleeing as a result of the action. California tiger salamanders and California red-legged frogs are more likely to disperse overland in mesic conditions. Because all ground-disturbing maintenance activities occurring in the channel would take place during the dry season, these impacts are less likely.

California red-legged frog tadpoles may be injured or killed if entrained by pump or water diversion intakes. Screening pump intakes as proposed by SCVWD, will reduce the potential that tadpoles would be caught in the inflow.

Trash left during or after SMP activities could attract predators to work sites, which could, in turn, prey on California tiger salamanders and California red-legged frogs. For example, raccoons are attracted to trash and also prey opportunistically on the California red-legged frog. This potential impact would be reduced or avoided by careful control of waste products at all works sites as proposed by the SCVWD.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or upland habitat to a degree where California tiger salamanders and California red-legged frogs are adversely affected or killed. The potential for this effect to occur can be reduced by implementation of measures proposed by the SCVWD to thoroughly inform workers of the importance of preventing hazardous materials from entering the environment, locating staging and fueling areas away from channels and the immediate floodplain, and by having an effective spill response plan in place.

Work in live streams or in floodplains could cause high levels of siltation downstream. This siltation could alter the quality of the habitat to the extent that use by individuals of the species is precluded. Implementing BMPs for erosion control and reducing the area to be disturbed to the minimum necessary should decrease the amount of sediment that is washed downstream as a result of SMP activities.

Uninformed workers could disturb, injure, or kill California tiger salamanders and California red-legged frogs. The potential for this to occur may be greatly reduced by proposed education of workers as to the presence and protected status of this species and the measures that are being implemented to protect it during SMP activities.

Any replacement of natural banks, or banks that are armored but that provide refugia for California tiger salamanders and red-legged frogs or their prey, with banks that provide no such refugia (e.g., concrete crib walls or sacked concrete) could result in the loss of upland refugial habitat for the California red-legged frog. Conversely, replacement of "hard" bank substrates with "softer" substrates, which could also potentially occur under the SMP, would enhance California tiger salamander and California red-legged frog habitat by increasing the availability

of riparian vegetation and small mammal burrows to California red-legged frogs and California tiger salamanders. The extent of long-term effects on California tiger salamander and California red-legged frog habitat resulting from bank stabilization activities is unknown, because stabilization activities cannot be anticipated and because the magnitude of the impact of stabilization depends on the type of repair method used. Based on the locations where bank stabilization activities have generally been required since 2002 and the annual limits (one linear mile of channel) on this activity, the acreage of potential California tiger salamander and California red-legged frog habitat that may be impacted by bank stabilization work is estimated at 1.5 acres for California tiger salamander and 4.0 acres for California red-legged frog each year of the 2014-2023 SMP time period.

Sediment removal activities (e.g., sediment removal, access road construction, and staging area construction) may result in the removal of instream emergent vegetation and riparian vegetation along the channel banks, resulting in the loss of up to 61 acres of instream habitat and associated streamside habitat for California red-legged frogs (i.e., the emergent vegetation and submerged roots to which eggs are attached) during the 2014-2023 SMP time period. Sediment removal activities may result in impacts to up to 10 acres of upland habitat potentially used by the California tiger salamander between the years 2014-2023. Loss of subterranean habitat for California tiger salamanders and California red-legged frogs may occur due to filling or compaction of crevices/holes on levee surfaces or slopes, and control of burrowing mammals on levees. Removal of burrows that California tiger salamanders and California red-legged frogs use as refugia could result in increased mortality due to predation or desiccation. Although mammals will continue to excavate new burrows, the repeated "short-term" impacts resulting from burrow management could have longer-term effects. In addition, a reduction in the quantity of subterranean habitat available may occur as a result of surface application control methods aimed at preventing rodent activity. The extent of long-term effects on California tiger salamander and California red-legged frog habitat resulting from animal conflict management activities is unknown because the extent and specific locations for animal conflicts management are not generally known. However, the SCVWD estimates that levees potentially requiring burrowing mammal control occupy approximately 20 acres in potential California tiger salamander habitat and 17 acres in potential California red-legged frog habitat between the years 2014-2023.

Manual vegetation management activities, including mowing, pruning, and hand removal, will result in the removal of vegetation that could provide cover for California red-legged frogs, potentially subjecting frogs to increased mortality due to predation or desiccation. Injury or mortality of California red-legged frogs and California tiger salamanders could also occur from being crushed by equipment, maintenance materials, and worker foot traffic associated with vegetation management activities. These activities will occur during the daytime, and primarily during the dry season, when California tiger salamanders would be in subterranean refugia and California red-legged frogs would be in or close to aquatic habitats. With implementation of impact avoidance and minimization measures, the number of individuals that could be affected by these activities is not expected to be high. Nevertheless, manual vegetation management activities may result in impacts to up to 286 acres of potential California tiger salamander habitat and 137 acres of potential California red-legged frog habitat between the years 2014-2023.

Impacts of SMP activities on California tiger salamander and California red-legged frog populations, and on these species as a whole, will be relatively low. The majority of the potential

habitat for these species to be impacted is of low quality for the species due to a long history of urban and agricultural land uses, and in many areas, impediments to dispersal minimize the potential for occurrence and minimize the numbers of individuals that may occur in impact areas. The proposed activities involve ongoing maintenance of a type that has been performed along these streams for decades (or longer). Further, the SCVWD has not detected any California tiger salamanders or California red-legged frogs in the proposed impact areas despite numerous pre-activity surveys conducted for previous maintenance activities. Therefore, the number of individuals that will be impacted by SMP activities is expected to be low.

Best management practices described in the Avoidance, Minimization, and Conservation Measures section above will be implemented prior to and during work activities in order to avoid and minimize adverse effects to all life stages of California red-legged frogs and California tiger salamanders. Compensation will be in the form of payment of fees to the VHP and/or according to the Service's most current Section 7 Off-Site Compensation Guidelines. If compensation is not provided via payment of fees to the VHP, habitat conservation will be proposed to the Service for review, approval, and implemented by the Corps via the SCVWD prior to project impacts to compensate for unavoidable impacts to California red-legged frogs and California tiger salamanders and their habitat at a 3:1 ratio (i.e. compensation : impact).

California Red-legged Frog Critical Habitat

SMP activities may result in both adverse and beneficial effects on all PCEs of designated critical habitat for the California red-legged frog. Based on the SCVWD assessment of areas where SMP activities are most likely to occur, SMP activities have the potential to adversely affect approximately 1.10 acres of designated critical habitat. However, because SMP activities may include activities that are not anticipated at this time, but that could occur anywhere within the SMP Area (i.e., within Santa Clara County and below the 1000-ft elevation contour), it is possible that SMP activities could result in greater impacts on critical habitat of the California red-legged frog. Table 4 indicates the critical habitat units that could potentially be affected both by SMP activities that the SCVWD currently anticipates being likely to occur and by additional SMP activities that cannot be anticipated at this time, and a "cap" indicating the maximum acreage of permanent or temporary impacts to critical habitat that are expected to occur over the next 10 years.

Table 1. Impacts on California Red-legged Frog Critical Habitat Years 2014-2023

Species	Critical Habitat Unit	Impact Estimate (acres)	Maximum Potential Impact (acres)
California Red-legged Frog	STC-1	0	5.0
	STC-2	1.1	5.0
	Total	**1.1**	**10.0**

However, adverse effects of SMP activities on California red-legged frog critical habitat will be limited to very small areas near the northern end of Coyote Reservoir and the junction of Dexter Creek and Coyote Creek. Implementation of BMPs will avoid or minimize the majority of impacts to these PCEs.

California Tiger Salamander Critical Habitat

Although the Action Area contains designated critical habitat for the California tiger salamander, the SCVWD does not know, at this time, of any SMP activities that are likely to be needed within designated critical habitat. The SCVWD could, however, potentially identify SMP activities, possibly including mitigation activities, within designated critical habitat. Table 3 indicates the critical habitat units that could potentially be affected by SMP activities and a "cap" indicating the maximum acreage of impacts to critical habitat that may occur between the years 2014-2023.

Table 2. Impacts on California Tiger Salamander Critical Habitat Years 2014-2023

Species	Critical Habitat Unit	Impact Estimate (acres)	Maximum Potential Impact (acres)
California Tiger Salamander	San Felipe Creek (Unit 7)	0	1.0
	Laurel Hill (Unit 8)	0	2.0
	Cebata Flat (Unit 9)	0	2.0
	Lions Peak (Units 10a and 10b)	0	1.0
	Braen Canyon (Unit 11)	0	1.0
	San Felipe (Unit 12)	0	2.0
	Total	**0**	**9.0**

SMP activities could result in both adverse and beneficial effects on PCEs of designated critical habitat for the California tiger salamander, if activities occur within critical habitat. Therefore, adverse effects of SMP activities on tiger salamander critical habitat will be very limited, if they occur at all between the years 2014-2023. Implementation of BMPs will avoid or minimize the majority of short-term impacts to these PCEs, and the mitigation program will compensate for any residual adverse effects on critical habitat.

California Clapper Rail

California clapper rails could be disturbed by human activity and movement of equipment as a result of bank stabilization, sediment removal (or reuse), manual vegetation management, management of animal conflicts, or minor maintenance. Disturbance such as loud noise or the presence and movement of people and heavy equipment in or near clapper rail habitat may alter bird behavior in ways that result in injury, mortality, or reduced nesting success. Such disturbance could result in temporary habitat loss due to California clapper rail avoidance of areas that have suitable habitat but intolerable levels of disturbance; abandonment of nests, eggs, or young by nesting pairs; a reduction in foraging efficiency if high quality foraging areas are impacted; and increased movement or flushing from cover, or altered activity patterns, that reduce energy reserves and increase predation risk.

SMP activities could be disruptive to clapper rail breeding efforts if they occur in or near occupied habitat during the breeding season. Disturbance could cause short-term effects such as failure to breed, nest abandonment, lower numbers of eggs, juvenile abandonment, and overall

lower juvenile survivorship. In addition, successful reproduction may not occur while the disturbance is ongoing, but may resume after maintenance activities are completed.

Even with the implementation of measures to minimize disturbance near clapper rail nesting areas during the breeding season, birds that disperse away from disturbance may not successfully establish new breeding territories and breed. Clapper rails forced to disperse would need to either maintain existing pair bonds or develop new pair bonds and establish new breeding territories in other suitable habitat areas. The ability of these clapper rails to reestablish new breeding territories would be hampered by the fact that clapper rails maintain year-round home ranges and defend established breeding territories from intrusions by other clapper rails. Loss of any female clapper rails would be compounded by the loss of potential future progeny.

Disturbance during the non-breeding season could also result in harassment, harm, or mortality of clapper rails. Clapper rails could be forced to adjust the boundaries of their territories or to disperse to other habitat areas. Displaced individuals and their eggs or young could be subjected to injury or mortality from starvation, physiological stress, and increased predation. Clapper rails disturbed by work activities also could be subjected to predation if they increase their movements within their home range or disperse to other nearby or distant tidal wetlands.

These threats are expected to occur very rarely, if at all. SCVWD maintenance activities along tidal channels typically occur in the upper reaches of tidal channels, where the fresh (or slightly brackish) vegetation is less suitable for clapper rails than salt marsh vegetation along lower reaches. Sediment removal activities are not expected to occur within suitable breeding habitat for this species, and bank stabilization is unlikely to be needed in and near the tidal salt and brackish marsh habitats in which this species occurs. Minor maintenance activities, such as repair or maintenance of tide gates or other water control structures, could potentially occur nearer to saltmarsh habitat, but such activities will occur very infrequently (not annually). Implementation of BMP GEN-6, which indicates that all SMP activities immediately adjacent to California clapper rail habitat will occur only during the non-breeding season, would likely prevent any disturbance of breeding rails, and BMP GEN-11, which prohibits work in or adjacent to clapper rail habitat during very high tides, would likely minimize flushing of rails from the edges of levees during maintenance/access activities.

The 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments lists South San Francisco Bay and the Guadalupe River as mercury impaired waterbodies. Thus, SMP activities along the Guadalupe River or Alviso Slough may expose soils contaminated with mercury. Mercury is injested by clapper rails primarily through contaminated prey. Although mercury intake is not sufficient to result in lethal toxosis of adults or young, mercury is extremely toxic to embryos and thus results in high levels of egg inviability and reduced clapper rail fecundity. Schwarzbach et al. (2006) found high mercury levels and low hatching in clapper rail eggs throughout San Francisco Bay. They also suggested that mercury exposure could slow or stunt development of young, possibly increasing predation risk.

Clapper rails are currently exposed to mercury when foraging on mudflats and in sloughs with high levels of mercury contamination. The Proposed Action has the potential to increase the exposure of clapper rails to mercury by stirring up sediments during maintenance activities in contaminated channels. Mercury-contaminated sediments that are currently buried too deep to adversely affect clapper rails could be mobilized by these activities, entering the food chain.

However, implementation of BMP GEN-3, which involves testing of sediments in certain areas and remediation if disturbed or excavated soils exposed to streamflow exceed certain mercury concentrations, will minimize such adverse effects. Effects of mercury mobilization on the California clapper rail are expected to be neutral over the 10 years of SMP implementation as compared to the existing situation because the SCVWD is proposing to continue maintenance activities that are ongoing, and the implementation of BMP GEN-3 will prevent effects of mercury mobilization from worsening, compared to current conditions.

Within tidal salt or brackish marshes, any replacement of natural bank with hard armoring (e.g., concrete crib walls or sacked concrete) could result in the loss of breeding and/or foraging habitat for the California clapper rail. Replacement of natural banks with armoring would preclude the re-establishment of vegetation that provides cover and foraging habitat. Conversely, replacement of "hard" bank substrates with "softer" substrates, which could also potentially occur under the SMP, would enhance clapper rail habitat by increasing the availability of suitable upland habitat. However, the extent of bank stabilization work that is expected to occur in California clapper rail habitat will be very low, judging from SMP activities since 2002. The SCVWD expects that no more than 0.5 acre of clapper rail habitat, and likely much less, will be disturbed as a result of 2014-2023 bank stabilization activities and no population level effects are expected.

Best management practices described above will be implemented prior to and during work activities in order to avoid and minimize adverse effects to California clapper rail(s). Habitat compensation will be proposed to the Service for review, approval, and implemented by the Corps via the SCVWD prior to project impacts to compensate for unavoidable impacts to California clapper rail(s) and their habitat at a 3:1 ratio (i.e. compensation : impact). Compensation will be according to the Service's most current Section 7 Off-Site Compensation Guidelines. It is expected that compensation will include habitat restoration or other measureable benefits for the California clapper rail.

Salt Marsh Harvest Mouse

In the absence of conservation measures, SMP activities could result in increased levels of disturbance to harvest mice from noise, vibrations from equipment, and maintenance activities. Disturbance could result in displacement of harvest mice from protective cover and their territories/home ranges (through noise and vibrations), which may disrupt normal behavior patterns of breeding, foraging, sheltering, and dispersal. Displaced harvest mice may have to compete for resources in occupied habitat, and may be more vulnerable to predators. Implementation of BMP GEN-11 will avoid direct take of salt marsh harvest mice.

SMP activities along the Guadalupe River or Alviso Slough may expose soils contaminated with mercury, adversely affecting the salt marsh harvest mouse. Effects of methylmercury exposure on wildlife can include mortality (death), reduced fertility, slower growth and development, and abnormal behavior that effects survival, depending on the level of exposure (Scheuhammer et al. 2007, EPA 2010). The exposure of sediment-bound mercury or the re-suspension of such sediments in wetland habitats as a result of SMP activities could result in an increase in the uptake of mercury by salt marsh harvest mouse food plants such as pickleweed (Best et al. 2008), thereby increasing the mouse's dietary exposure to mercury. However, effects of mercury mobilization on the salt marsh harvest mouse are expected to be neutral over the 10 years of the SMP-2 term as compared to the existing situation because the SCVWD is proposing to continue

maintenance activities that are ongoing, and the implementation of BMP GEN-3 will prevent effects of mercury mobilization from worsening, compared to current conditions.

Any replacement of natural bank with hardscape (e.g. concrete crib walls or sacked concrete) could result in the loss of breeding and foraging habitat for the salt marsh harvest mouse. Replacement of natural banks with armoring would preclude the re-establishment of vegetation that provides cover and foraging habitat. Conversely, replacement of "hard" bank substrates with "softer" substrates, which could also potentially occur under the SMP, would enhance salt marsh harvest mouse habitat. The extent of long-term effects on salt marsh harvest mouse habitat resulting from bank stabilization activities is unknown, both because stabilization activities are not currently known and because the magnitude of the effect of stabilization depends on the type of repair method used. However, the extent of bank stabilization work that is expected to occur in salt marsh harvest mouse habitat will be low, judging from SMP activities since 2002. The SCVWD expects that no more than 0.5 acre of salt marsh harvest mouse habitat, and likely much less, will be impacted as a result of 2014-2023 bank stabilization activities.

Although no sediment removal is expected to occur within potential salt marsh harvest mouse habitat, it is possible that sediment removal could be required (beyond the sediment removal at flap gates, which is considered minor maintenance). If sediment removal were necessary in salt marsh harvest mouse habitat, then given the time that would be required for sediment to build up and become colonized by vegetation adequate to support harvest mice (likely 5 years or perhaps more), this sediment removal would thus result in a long-term loss of habitat for this species.

Vegetation management activities such as mowing on levees could remove suitable harvest mouse habitat, including protective vegetation that provides cover in upland transitional areas during high tides. Some of this vegetation management, such as control of perennial pepperweed in the Coyote Creek bypass, is actually beneficial to the salt marsh harvest mouse because it inhibits the invasion of suitable habitat by the non-native pepperweed. However, some vegetation management will remove suitable habitat for this species. Although the loss of habitat resulting from vegetation management would be temporary in any given area, the frequency with which most vegetation management in potential harvest mouse habitat will occur will preclude the recovery of high-quality habitat. Therefore, manual vegetation management will result in long-term adverse effects on up to 1.5 acres of salt marsh harvest mouse habitat between the years 2014-2023.

The amount of expected habitat disturbance or loss described above during the time period of 2014-2023 is likely to be minimal and not likely to have any long term effects to any population(s).

California Least Tern

Although California least terns do not breed in or adjacent to the Action Area, the South Bay is an important post-breeding staging area. California least terns forage in late summer and early fall over the open waters of the Bay and in saline managed ponds within and adjacent to the Alviso area and both adult and juvenile least terns roost on saline managed pond levees and boardwalks. Thus, the Proposed Action has potential to affect foraging habitats and/or individuals of this species if maintenance activities occur near occupied foraging habitat. For example, maintenance activities near foraging habitat could harass least tern(s) through the

alteration of foraging patterns by avoidance of activity areas due to increased noise and activity levels during maintenance activities. Mortality or injury of individuals is not likely or expected.

No sediment removal or manual vegetation management activities are anticipated to occur in the saline managed ponds or pond levees used for foraging and roosting by the least terns, although minor maintenance activities include limited sediment removal at flap gates of managed bayside ponds. Sediment that is removed from other locations potentially could be deposited in areas close to least tern foraging and roosting areas (e.g., to provide upland transition zone habitat for future marsh restoration). Although disturbance associated with such sediment reuse activities may temporarily limit use of a certain area by least terns, levees used for roosting by these terns will not be used for sediment deposition. At any given time, SMP activities may result in the disturbance of waterbirds such as terns using far less than one percent of bayside managed ponds in the Action Area between the years 2014-2023.

Thus, only indirect adverse effects on this species and its habitats resulting from the Proposed Action will be very limited if they occur at all. In addition, compensation of impacts to tidal habitats and species via restoration is expected to benefit the least tern both by providing foraging habitat during high tides, in the short-term (until these marshes become well vegetated), and in the long-term by serving as nurseries for fish that provide prey for least terns.

Snowy Plover

Although no SMP activities are anticipated in or adjacent to habitat that is currently used by nesting snowy plovers, this species can select breeding areas opportunistically, and it is possible that changes in habitat during the period 2014-2023 could result in use of new areas by breeding plovers. For example, if management of ponds adjacent to SMP activities (such as Pond A4 between Moffett Channel and Guadalupe Slough, or Pond A18 adjacent to South Coyote Slough) changes so that these ponds become suitable for nesting, then plovers may nest in areas adjacent to SMP activities. Likewise, it is possible that activities such as vegetation management or management of animal conflicts may need to occur in areas adjacent to snowy plover nesting and foraging, such as along segments of Alviso Slough adjacent to Pond A12. In such cases, no SMP activities will directly alter snowy plover breeding habitat, as SMP activities will be limited to levee roads around the ponds and vegetated habitats, neither of which are used (in the SMP area) by snowy plovers. Non-breeding individuals may occasionally forage in the San Jose-Santa Clara Water Pollution Control Plant sludge ponds, or possibly at the Coyote Creek Reach 1A waterbird pond, both of which are very close to projected SMP activities.

Implementation of BMP GEN-6, which entails pre-activity surveys for nesting birds and maintenance of a buffer around actively nesting plovers, is expected to avoid harm, injury, or mortality of snowy plover eggs or young. SMP activities are not expected to cause harm, injury, or mortality of snowy plovers nor have any long-term effects to snowy plovers or habitat.

Least Bell's Vireo

Potential effects on least Bell's vireos due to bank stabilization activities include harassment of individuals by equipment, vehicle traffic, and worker foot traffic. Activities resulting in a substantial increase in noise, movement of equipment, or human presence near active nests could result in the harassment of young or adults. In addition, increased human activity may affect the

behavior of least Bell's vireos, causing them to avoid activity areas and possibly exposing them to increased competition with other birds in the areas to which they disperse and increased levels of predation due to unfamiliarity with the new area. Establishment of buffer(s) associated with BMP GEN-6 is expected to minimize these potential effects.

Because areas that will require bank stabilization are not currently known, the extent of the area over which these effects might occur cannot be accurately quantified. However, based on past work records, SCVWD stabilizes less than 0.25 mile of stream bank per year throughout the Pajaro River Basin, a portion of which is suitable habitat for the least Bell's vireo. Given the extent of bank stabilization activities expected in the Pajaro River Basin and the localized, sporadic nature of occurrence of this species, there is a low probability that nesting least Bell's vireos would be impacted by bank stabilization activities. Up to 1.2 acres/yr of potential least Bell's vireo habitat could be impacted by bank stabilization activities. The SCVWD would implement BMP GEN-6 to avoid impacts of SMP activities to nesting birds, thus ensuring avoidance of harming least Bell's vireos. Injury or mortality of least-Bell's vireo due to bank stabilization activities is not expected.

Based on the SCVWD assessment of areas where sediment removal is most likely to be proposed during the period 2014-2023, sediment removal activities are expected to impact approximately 1.0 acre of potential least Bell's vireo habitat along Bodfish, Llagas, and Uvas-Carnadero Creeks. The SCVWD would implement BMP GEN-6 to avoid impacts of SMP activities to nesting birds, thus ensuring avoidance of impacts to nests of least Bell's vireos. Injury or mortality of least-Bell's vireo due to sediment removal activities is not expected.

Many of the short-term effects resulting from bank stabilization activities could also occur during manual vegetation management activities (e.g., hand pruning, hand removal, and mowing). Hand removal of vegetation and mowing is expected to result in the temporary loss of vegetation that may be used for nesting or foraging, as well as disturbance of birds foraging or nesting in adjacent areas. Increased noise, movement of equipment, or human presence in this habitat could result in the abandonment of habitat, or preclude the use of habitat by vireos that would have otherwise attempted nesting. Manual vegetation management activities may result in impacts to up to 31 acres of potential least Bell's vireo habitat. The SCVWD would implement BMP GEN-6 to avoid impacts of SMP activities to nesting birds, thus ensuring avoidance of impacts to nests of least Bell's vireos. Harm, injury or mortality of least-Bell's vireo due to vegetation management activities is not expected.

Management of animal conflicts will not result in direct effects on least Bell's vireo habitat, and nests of this species are not expected to be physically disturbed or destroyed during animal conflicts management activities. Vehicle and worker foot traffic would likely be of such short duration in any given area that they are unlikely to disturb even nesting vireos to the point of nest or territory abandonment. However, more intensive or noisy activities, such as filling of burrows or installation of surface treatments to inhibit burrowing by mammals along levees, could disturb nesting vireos as described above for bank stabilization and other activities. The SCVWD estimates that approximately 3.2 linear miles of levees potentially requiring burrowing mammal control occur along channels supporting potential least Bell's vireo habitat.

Avoidance, minimization, and compensation measures proposed should minimize the overall potential of SMP program effects to least Bell's vireo(s) and can be adapted as necessary for the

benefit of the least Bell's vireo.

In summary, SMP impacts on least Bell's vireo populations, is expected to be very low. This species' occurrence in the Action Area is sporadic, and only two nesting attempts, one in 1932 and the other in 1997, are known, both from the extreme southern edge of the Action Area. In any given year, it is unlikely that the species is present at all in the Action Area. As the species' populations in southern California recover and the species' range of regular occurrence expands, the potential for occurrence in the Action Area will increase, but BMPs (including pre-activity surveys in potential vireo habitat and buffers around occupied areas) will likely avoid impacts to active nests.

Table 3. Summary of Effects and Compensation

	Effects by Activity Type (acres)					
Species	**Bank Stabilization**	**Sediment Removal**	**Vegetation Management**	**Animal Conflicts Management**	**Total Effects**	**Compensation[2]**
California Tiger Salamander	15	10	286	20	331	VHP land-use fees or up to 993 acres of habitat creation and management
California Red-legged Frog	40	61	137	17	255	VHP land-use fees or up to 765 acres of habitat creation and management
Least Bell's Vireo	12	1	31.0	0[1]	44	VHP land-use fees, vegetation management only once/10 years, or up to 132 acres of habitat creation and management
California Clapper Rail	0.5	0	1.5	0	2	Up to 6 acres of habitat restoration and protection
Salt Marsh Harvest Mouse	0.5	0	1.5	0	2	Up to 6 acres of habitat restoration and protection
California Least Tern	0	0	0	0	0	No compensation because harm, injury, and mortality is not expected to occur
Western Snowy Plover	0	0	0	0	0	No compensation because harm, injury, and mortality is not expected to occur

[1] Animal conflicts management will occur along habitat that may be occupied by vireos, but no vireo habitat will be impacted, and BMPs will avoid having work performed in areas where nesting vireos are present.

[2] For impacts to an area where multiple species may occur, compensatory mitigation need only be provided once (e.g., payment of VHP fees will offset impacts to California tiger salamanders, California red-legged frogs, and least Bell's vireo in a given area, or tidal habitat restoration will offset impacts to California clapper rails and salt marsh harvest mice in a given area), rather than being provided for all species in an additive fashion, as long as that mitigation is suitable for species using that impacted area.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the Action Area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of any cumulative effects.

Conclusion

After reviewing the current status of the California red-legged frog, California tiger salamander California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo, the environmental baseline for the Action Area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that projects which meet the qualifications for this Programmatic Biological Opinion are not likely to jeopardize the continued existence of these species. This conclusion is based on the impact limits, BMP's, and compensation measures to avoid and minimize adverse effects for each species.

After reviewing the current status of California red-legged frog and California tiger salamander critical habitat, the environmental baseline of critical habitat in the Action Area, and the effects of the proposed action, and the cumulative effects on the critical habitat, it is the Service's biological opinion that projects which meet the qualifications for this Programmatic Biological Opinion, are not likely result in the destruction or adverse modification of California red-legged frog or California tiger salamander critical habitat. We base this conclusion on the following: (1) the anticipated impacts to the California red-legged frog and California tiger salamander are only 1.1 acres and 0 acre over a 10 year timeframe, respectively; and (2) potential impacts to the California red-legged frog and California tiger salamander that are not known at this time, but possible over a 10 year timeframe are not to exceed 10 acres and 9 acres, respectively.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or Applicant must report the progress of the

action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

California red-legged frog and California tiger salamander

The Service anticipates that incidental take of the California red-legged frog and California tiger salamander will be difficult to detect because when these amphibians are not located in breeding habitat, they inhabit the burrows of ground squirrels, other rodents, or other microhabitat features. It may be difficult to locate these species due to their cryptic appearance and behavior; the sub-adult and adult animals may be located a distance from breeding habitat; dispersal and migration occurs during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of their relatively small body size. Losses of these species also may be difficult to quantify due to seasonal fluctuations in numbers, random environmental events, changes in water regimes at breeding sites, or other environmental disturbances. Therefore, the Service anticipates that all California red-legged frogs and California tiger salamanders inhabiting the approximately 255 acres and 331 acres of habitat respectively, will be subject to incidental take in the form of harm, harassment, capture, injury, or death over 10 years. A maximum of 5 California red-legged frog individuals and 5 California tiger salamander individuals per year and a maximum of 50 California red-legged frog individuals and 50 California tiger salamander individuals over 10 years may be subject to incidental take in the form of death or injury as a result of SMP activities. Additionally, up to 765 acres and 993 acres of California red-legged frog and California tiger salamander habitat may be subject to incidental take in the form of harm, harassment, capture, injury, or death due to habitat creation, restoration, or enhancement activities. A maximum of 2 California red-legged frog individuals and 2 California tiger salamander individuals per year and a maximum of 20 California red-legged frog individuals and 20 California tiger salamander individuals over 10 years may be subject to incidental take in the form of death or injury as a result of SMP compensation activities. Upon implementation of the Reasonable and Prudent Measures, incidental take associated with the proposed action in the form of harm, harassment, capture, injury, and death of the California red-legged frog and California tiger salamander caused by SMP activities will become exempt from the prohibitions described under section 9 of the Act.

California Clapper Rail

The Service anticipates that incidental take of the California clapper rail will be difficult to detect or quantify because of the reclusive nature of this species. Incidental take for California clapper rails is expected in the form of harassment of all California clapper rails in approximately 2 acres of existing California clapper rail habitat due to 2014-2023 SMP activities.

Salt Marsh Harvest Mouse

The Service anticipates that incidental take of the salt marsh harvest mouse will be difficult to detect or quantify because of the variable, unknown size of any resident population over time, and the difficulty of finding killed or injured small mammals. Incidental take for salt marsh harvest mouse is expected in the form of harm or mortality of up to two (2) salt marsh harvest mice annually and harassment of all salt marsh harvest mice on approximately 2 acres of habitat

due to 2014-2023 SMP activities.

California Least Tern

The Service anticipates that incidental take of the California least tern may occur in the form of harassment to individuals foraging in late summer and early fall in saline managed ponds within and adjacent to Alviso. California least terns may avoid foraging habitat due to increased noise and activity levels during maintenance activities. Up to five least terns per year could be taken by harassment for a total of 50 terns disturbed due to 2014-2023 SMP activities.

Snowy Plover

The Service anticipates that incidental take of the snowy plover may occur in the form of harassment to an unknown number of individuals of snowy plovers that may attempt to nest at Pond A4 between Moffett Channel and Guadalupe Slough, or Pond A18 adjacent to South Coyote Slough if these ponds become suitable for nesting in the future. Foraging or nesting snowy plovers may be harassed by SMP activities (i.e. vegetation management or management of animal conflicts) such as along segments of Alviso Slough adjacent to Pond A12, San Jose-Santa Clara Water Pollution Control Plant sludge ponds, or at the Coyote Creek Reach 1A waterbird pond.

Implementation of BMP GEN-6, which entails pre-activity surveys for nesting birds and maintenance of a buffer around actively nesting snowy plovers, is expected to avoid injury or mortality of snowy plover eggs or young. Up to two snowy plovers per year could be taken by harassment for a total of 20 snowy plovers due to 2014-2023 SMP activities.

Least Bell's Vireo

The Service anticipates that incidental take of the least Bell's vireo may occur in the form of harassment to an unknown number of individuals associated with 0.25 mile of stream bank stabilization activities per year and up to 1.2 acres per year throughout the Pajaro River Basin during 2014-2023 of SMP stream bank activities. Injury or mortality of least-Bell's vireo due to bank stabilization activities is not expected. Harassment of an unknown number of least Bell's vireo may occur on up to 31 acres of habitat due to vegetation management activities and approximately 3.2 miles of levees associated with management of animal conflicts during 2014-2023.

Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the California red-legged frog, California tiger salamander California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo.

Reasonable and Prudent Measures

The Service has determined that the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of the California red-legged frog,

California tiger salamander California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo:

1. The Corps shall minimize adverse effects to the California red-legged frog, California tiger salamander California clapper rail, salt marsh harvest mouse, California least tern, snowy plover, and least Bell's vireo.

2. The Corps will fully implement and adhere to the minimization and avoidance measures, as described in the *Description of the Proposed Action* of this biological opinion.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These Terms and Conditions are nondiscretionary.

The following Terms and Conditions implement the Reasonable and Prudent Measure number one (1):

1. The Corps shall include the avoidance and minimization measures, as described in the *Description or the Proposed Action* of this biological opinion, as a required term in their permit requirements.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Reporting Requirements

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, the Corps or applicant shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, the Corps must reinitiate formal consultation as per 50 CFR 402.16.

1. The Service must be notified within one (1) working day of the finding of any injured or dead listed species or any unanticipated damage to its habitat associated with the proposed project. Notification will be made to the Coast Bay – Forest Foothill Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600, and must include the date, time, and precise location of the individual/incident clearly indicated on a U.S. Geological Survey 7.5 minute quadrangle or other maps at a finer scale, as requested by the Service, and any other pertinent

information. When an injured or dead individual of the listed species is found, the Corps shall follow the steps outlined in the Disposition of Individuals Taken section below.

Disposition of Individuals Taken

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instruction s are received from the Service regarding the disposition of the dead specimen. The Service contact persons are the Coast Bay – Forest Foothill Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at (916) 414-6600; and the Resident Agent-in-Charge of the Service's Office of Law Enforcement, 5622 Price Way, McClellen, California 95562, at (916) 569-8444.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

- The Service recommends the Corps identify recovery actions in existing recovery plans and 5-year reviews that the Corps can assist in implementing or influence results through its jurisdiction or partner(s). The Corps can coordinate with the Service on an annual basis at a minimum and more frequent as needed.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

RENITIATION - CLOSING STATEMENT

This concludes formal consultation on the proposed action. As provided in 50 CFR 402.16, reinitiating of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must immediately cease, pending reinitiating.

If you have any questions regarding this biological opinion on the proposed action, please contact Vincent Griego or Ryan Olah of my staff at the letterhead address, at telephone (916) 414-6600, or by electronic mail at Vincent_Griego@fws.gov or Ryan_Olah@fws.gov.

Sincerely,

Jennifer M. Norris
Field Supervisor

Enclosure

cc:
Lisa Mangione, Department of Fish and Wildlife, San Francisco, California
Jon Rohrbough, Regional Water Quality Control Board, San Luis Obispo, California
Margarete Beth, Regional Water Quality Control Board, Oakland, California
Gary Stern, National Marine Fisheries Service, Santa Rosa, California
Darren Howe National Marine Fisheries Service, Santa Rosa, California
Luisa Valiela, Environmental Protection Agency, San Francisco, California

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Sacramento Fish and Wildlife Office
Review Criteria for Section 7 Compensation
Revised January 30, 2014

Property Assurances and Conservation Easement

- ☐ Title Report [*preliminary at proposal, and Final Title Insurance at recordation*]; no older than six months;
- ☐ Property Assessment and Warranty;
- ☐ Subordination Agreement [*include if any outstanding debts or liens on the property; may be needed for existing easements*];
- ☐ Legal Description and Parcel Map;
- ☐ Conservation Easement [*use the current SFWO standardized CE template*]; or
- ☐ Non-Template Conservation Easement [*this requires additional review*]

Site Assessment and Development

- ☐ Phase I Environmental Site Assessment;
- ☐ Habitat Development Plan [*include if habitat will be constructed, restored, or enhanced*];
- ☐ Construction Security Analysis *[applicable if habitat is being constructed/enhanced/restored]*;
- ☐ Performance Security Analysis [*applicable if there are performance standards*];

Site Management

- ☐ Interim Management Plan;
- ☐ Interim Management Security Analysis and Schedule;
- ☐ Long-Term Management Plan;
- ☐ Endowment Fund Analysis and Schedule;
- ☐ Endowment Funding Agreement or Trust Agreement or Declaration of Trust [*DFW calls this a "mitigation agreement"*]

Guidelines

Real Estate Assurances and Conservation Easement (CE)

Title Report

1. Who holds fee title to property?
2. Exceptions to title. Are there any liens or encumbrances (existing debts, leases, or easements) on the property? Note that any existing exceptions to title will have priority over a conservation easement for the mitigation project.
    a. Review Preliminary Title Report to evaluate liens and encumbrances (see Property Assessment and Warranty, below).
    b. Could any of these exceptions to title potentially interfere with either biological habitat values or ownership? If existing easements can potentially interfere with the conservation values/habitat of the property, those portions of the land should be deducted from the total compensation acreage available on the site.
    c. Split estates. Have the water or mineral rights been severed from title? If so, property owner should be encouraged to re-acquire those rights, or at least to acquire the surface-entry rights to remove or limit access for mineral exploration/development.

Property Assessment and Warranty

1. Property owner should submit a Property Assessment and Warranty, which discusses every exception to title listed on the Preliminary Title Report and Final Title Insurance Policy, evaluating any potential impacts to the conservation values that could result from the exceptions to title (see below).
2. The Property Assessment and Warranty should include a summary and full explanation of all exceptions remaining on the title, with a statement that the owner/Grantor accepts responsibility for all lands being placed under the CE as available for the primary purposes of the easement, as stated in the easement, and assures that these lands have a free and clear title and are available to be placed under the CE.

Subordination Agreement

1. A Subordination Agreement is necessary if there is any outstanding debt on the property; it could also be used to subordinate liens or easements. Review Subordination Agreement language for adequacy—the lending bank or other lien or rights holder must agree to fully subordinate each lien, encumbrance, or easement under the CE.

Legal Description and Parcel Map

1. Ensure accuracy of map, and location and acreage protected under the CE.
2. Both the map and the legal description should explain the boundaries of the individual project compensation site. The site should *not* have 'leftover' areas for later use.
3. Ask for an easement map to be prepared (if applicable), showing all easements on the property.

Conservation Easement from Template

1. Who will hold the easement?
   a. Conservation easements require third-party oversight by a qualified non-profit or government agency (=easement holder or Grantee). Minimum qualifications for an easement holder include:
      i. Maintaining accreditation by the Land Trust Accreditation Commission http://www.landtrustaccreditation.org/home.
      ii. Organized under IRS 501(c)(3);
      iii. Qualified under CA Civil Code § 815;
      iv. Bylaws, Articles of Incorporation, and biographies of Boards of Directors on file at;
         1. Must meet requirements of SFWO, including 51% disinterested parties on the Board of Directors;
      v. Approved by SFWO
2. Project Applicant should submit a redline version showing all of their proposed revisions in track changes or other editable electronic format, along with an explanation of all deviations from the template.

Non-Template Conservation Easement

1. If not using the CE template, the Project Applicant should specify objections they have to the template. This may substantially delay processing as the non-template CE will require review by the Solicitor's Office. Alternate CEs are subject to SFWO approval prior to being granted and recorded.
2. The Project Applicant must either 1) add SFWO as a third-party beneficiary, or 2) add language throughout the document, in all appropriate places, that will assure SFWO the right to enforce, inspect, and approve any and all uses and/or changes under the CE prior to occurrence (including land use, biological management or ownership).
3. Include, at a minimum, language to:
   a. Reserve all mineral, air, and water rights under the CE as necessary to maintain and operate the site in perpetuity;
   b. Ensure all future development rights are forfeited;
   c. Ensure all prohibited uses contained in the CE template are addressed; and

d. Link the CE, Management Plan, and the Endowment Fund within the document (e.g., note that each exists to support the others, and where each of the documents can be located if a copy is required).

4. Insert necessary language, particularly, but not exclusively, per: (can compare to CE template):
   a. Rights of Grantee
   b. Grantee's Duties
   c. Reserved Rights
   d. Enforcement
   e. Remedies
   f. Access
   g. Costs and Liabilities
   h. Assignment and Transfer
   i. Merger
   j. Notices
5. Include a signature block for USFWS to sign "approved as to form".

Site Assessment and Development

Phase I Environmental Site Assessment

1. The Phase I ESA must show that the compensation site is not subject to any recognized environmental conditions as defined by the American Society for Testing and Materials (ASTM) Standard E1527-05 "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, available at http://www.astm.org/Standards/E1527.htm, (i.e., the presence or likely presence of any Hazardous Substances or petroleum products).
2. If the Phase I ESA identifies any recognized environmental conditions, the Project Applicant must represent and warrant to the SFWO that all appropriate assessment, clean-up, remediation, or removal action has been completed.
3. If the Phase I ESA identifies any recognized environmental conditions, a Phase II ESA may be needed for sampling and laboratory analysis.

Restoration or Habitat Development Plan [*not required if the site is preservation only*]

1. The overall plan governing construction and habitat establishment activities required to be conducted on the Property, including, without limitation, creation, restoration, and enhancement of habitat.
   a. This plan should include the baseline conditions of the Property including biological resources, geographic location and features, topography, hydrology, vegetation, past, present, and adjacent land uses, species and habitats occurring on the property, a description of the activities and methodologies for creating, restoring, or enhancing habitat types, a map of the approved modifications, overall habitat establishment goals, objectives and Performance Standards, monitoring methodologies required to

evaluate and meet the Performance Standards, an approved schedule for reporting monitoring results, a discussion of possible remedial actions, and any other information deemed necessary by the SFWO.

2. Any permits and other authorizations needed to construct and maintain the site shall be included and in place prior to the start of construction of the habitat.
3. Full construction plans for any habitat construction are subject to SFWO approval and must be *SFWO-approved prior* to the start of construction of the habitat.

Construction Security

1. Construction Security in the amount of 100% of a reasonable third party estimate or contract to create, restore, or enhance habitats on the property in accordance with the Restoration or Habitat Development Plan.
2. Construction Security can be drawn on should the project proponent default.
3. The Construction Security should be in the form of an irrevocable standby letter of credit or a cashier's check.
   a. LOC: issued for a period of at least one year, and provide that the expiration date will be automatically extended for at least one year on each successive expiration date unless, until extension is no longer necessary.
   b. Beneficiary: a third party subject to approval by the SFWO.
   c. Language in a draft letter of credit subject to approval by the SFWO.

Performance Security *[only necessary if habitat if performance standards have been identified]*

1. Performance Security in the amount of 20% of the Construction Security.
2. Performance Security can be drawn on should the Performance Standards not be met, if remedial action becomes necessary.
3. The Performance Security in the form of an irrevocable standby letter of credit or a cashier's check.
   a. LOC: issued for a period of at least one year, and provide that the expiration date will be automatically extended for at least one year on each successive expiration date unless, until extension is no longer necessary.
   b. Beneficiary: a third party who is subject to approval by the SFWO.
   c. Language in a draft letter of credit is subject to SFWO approval.

Site Management

Interim Management Plan

1. The Interim Management Plan should identify the short-term management, monitoring, and reporting activities to be conducted from the time construction ends until the Endowment Fund has been fully funded for three

years and all the Performance Standards in the Development Plan have been met. This may be the same as the Long-term Management Plan.

Interim Management Security Analysis and Schedule

The purpose of the Interim Management Security is to allow the endowment to grow for at least three years without any disbursements, and is a safeguard to ensure that there will be enough funds in the endowment to pay for future management costs. The period can be longer than three years; a 5 year period is recommended by many land trusts.

1. Interim Management Security (in the form of a standby letter of credit) in the amount equal to the estimated cost to implement the Interim Management Plan during the first three years of the Interim Management Period, as set for in the Interim Management Security Analysis and Schedule.
2. The Interim Management Security Analysis and Schedule should be in the form of a table and/or spreadsheet that shows all of the tasks (management, monitoring, reporting), task descriptions, labor (hours), cost per unit, cost frequency, timing or scheduling of the tasks, the total annual funding necessary for each task, and any associated assumptions for each task required by the Interim Management Plan. The total annual expenses should include administration and contingency costs.
3. The Interim Management Security:
   a. Held by a qualified, non-profit organization or government agency, subject to SFWO approval [see requirements under CE above], and
   b. Held according to minimum standards for assuring maximum success in earning potential, and will include assurances to safeguard against loss of principle.
   c. Instructions for disbursements or releases from the fund must be outlined in the Endowment Management Agreement/Trust Agreement/Declaration of Trust.

Long-Term Management Plan (LTMP)

1. The LTMP template identifies the long-term management, monitoring and reporting activities to be conducted.
2. The LTMP should include at minimum:
   a. Purpose of the Project and purpose of the LTMP;
   b. A baseline description of the setting, location, history, and types of land use activities, geology, soils, climate, hydrology, habitats present (once project meets Performance Standards), and species descriptions;
   c. Overall management, maintenance and monitoring goals; specific tasks and timing of implementation; and discussion of any constraints, which may affect goals;
   d. The Endowment Fund Analysis and Schedule (see below);

e. Discussion of Adaptive Management actions for reasonably foreseeable events and possible thresholds for evaluating and implementing Adaptive Management;
f. Rights of access to the Property and prohibited uses of the Property as provided in the CE; and
g. Procedures for Property transfer, land manager replacement, amendments, and notices.

3. The LTMP must be incorporated by reference in the CE.
4. The LTMP is considered a living document and may be revised as necessary upon agreement of the land manager, easement holder, and SFWO.

Endowment Fund Analysis and Schedule

1. Can use a PAR or PAR-like analysis and must be based upon the final LTMP, subject to SFWO approval.
   - The analysis should be developed with input by the land manager and conservation easement holder.
2. The analysis and schedule should be in the form of a table and/or spreadsheet that shows, at a minimum:
   - all of the tasks (management, monitoring, reporting)
   - task descriptions, with tasks numbers cross-referenced in management plan(s)
   - labor (hours)
   - materials
   - cost per unit (hr., linear ft., each, etc.).
   - cost frequency
   - timing or scheduling of the tasks,
   - the total annual funding necessary for each task, and
   - the assumptions required for each task by the Management Plan.
3. The total annual expenses should include administration and contingency costs (contingency can be included on each line item – identify the percentage). Unless there is a separate endowment for the purpose of monitoring and reporting on the CE conditions, then, the analysis should also include costs of
   - Monitoring and reporting CE conditions;
   - Defending the CE; and
   - Liability insurance.
4. The Endowment Fund::
   - Held by a qualified, SFWO-approved, non-profit organization or government agency [see requirements under CE above],
   - Held according to minimum standards for assuring maximum success in earning potential, and should include assurances for no loss of principle.
   - Disbursements or releases from the fund must be for documented expenditures, as they occur.

Endowment Funding Agreement

1. This is the agreement between the endowment holder and the Project Applicant, as to how the endowment is to be funded, held and disbursed;
2. USFWS is not signatory to this agreement, but there should be a signature block on the agreement for SFWO to sign "approved as to form";
3. USFWS has approval authority over the language in the document, and it must state that modifications or transfer of the endowment to another holder are subject to USFWS approval;
4. This agreement can also be called: "Trust Agreement", "Declaration of Trust"
5. When the CA Dept. of Fish and Wildlife is involved, this is called "Mitigation Agreement".