United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
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Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2010-F-0348

April 8, 2014

Margy Lindquist
District Conservationist
Natural Resources Conservation Service
65 South Main Street, Suite 108
Templeton, California 93465

Subject: Biological Opinion for the Proposed Partners in Restoration Permit Coordination Program, San Luis Obispo County, California (8-8-10-F-48)

Dear Ms. Lindquist:

This document transmits the U.S. Fish and Wildlife Service's biological opinion based on our review of the U.S. Department of Agriculture, Natural Resources Conservation Service's (NRCS) proposed San Luis Obispo County Partners in Restoration Permit Coordination Program (Program). The NRCS would implement 18 conservation practices outlined in the biological assessment (BA) included with your request. The conservation practices are designed to enhance fish and wildlife habitat, increase biodiversity, aid in the recovery of sensitive species, and improve water quality and quantity.

The Program would occur within San Luis Obispo County as a coordinated effort between the NRCS, the Coastal San Luis Resource Conservation District, and the Upper Salinas-Las Tablas Resource Conservation District (collectively, the RCDs). The NRCS enacted a Memorandum of Agreement (MOA) outlining the roles and capacity of the RCDs in relation to sponsoring the program. The MOA allows the RCDs, in conjunction with NRCS, to implement the Program within the RCDs' area of influence. While the RCDs would lead development and implementation of projects under the Program, the NRCS would retain discretionary authority over projects implemented under the Program through funding and a "Cooperator Agreement" with participating landowners. The NRCS and the RCDs would cooperatively maintain oversight of all individual projects through the planning, implementation, and monitoring phases of the Program. The NRCS and the RCD would provide technical and cost-share assistance to participating landowners (cooperators), ensure compliance with proposed protective measures and permit conditions, and provide annual reports to the Service and other regulatory agencies.

The NRCS requested formal consultation regarding the proposed Program's potential effects on the federally endangered longhorn fairy shrimp (*Branchinecta longiantenna*), least Bell's vireo (*Vireo bellii pusillus*), Morro shoulderband snail (*Helminthoglypta walkeriana*), San Joaquin kit fox (*Vulpes macrotis mutica*), giant kangaroo rat (*Dipodomys ingens*), and tidewater goby

(*Eucyclogobius newberryi*); and the federally threatened California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*; Central California distinct population segment), and vernal pool fairy shrimp (*Branchinecta lynchi*); and designated critical habitat for the California red-legged frog, California tiger salamander, Morro shoulderband snail, La Graciosa thistle (*Cirsium loncholepis*), and Camatta Canyon amole (*Chlorogalum purpureum* var. *reductum*). On March 28, 2012, you requested that potential effects of the Program on critical habitat for the vernal pool fairy shrimp and longhorn fairy shrimp be included in the formal consultation. On June 17, 2013, you requested that potential effects of the Program on the blunt-nosed leopard lizard (*Gambelia silus*) be included in the formal consultation. Your requests and this biological opinion were prepared in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).

Abbreviations

Act	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)
BA	Biological assessment
BLM	Bureau of Land Management
CDFW	California Department of Fish and Wildlife
County	San Luis Obispo County
CPNM	Carrizo Plain National Monument
DPS	Distinct Population Segment
RCD	Coastal San Luis Resource and Upper Salinas-Las Tablas Resource Conservation Districts
EPM	Environmental Protection Measure
LPNF	Los Padres National Forest
NRCS	Natural Resource Conservation Service
PCE	Primary Constituent Element
Service	U.S. Fish and Wildlife Service

Definitions

- Practice: Any of 18 conservation activities established by NRCS, each addressing one or more natural resource issues.
- Project: A single practice or multiple practices implemented in tandem to address one or more natural resource conservation need(s) on an applicant's property.
- Program: The comprehensive Partners in Restoration, Permit Coordination Program, which consolidates the multi-agency permitting process to facilitate natural resource conservation and habitat restoration activities on private land.

Geographic Scope

The geographic scope of the proposed Program is non-Federal land used for agriculture, ranching, etc. within San Luis Obispo County. Projects will not occur in the following areas:

- Land owned by the Federal government;
- Estuaries, sloughs, or lagoons;
- Vernal pools; or
- Dunes and coastal strand.

CONSULTATION HISTORY

In 2006, the Service and NRCS began informal discussions regarding proposed conservation measures and federally protected species and habitat concerns that should be included in the consultation. We received a June 22, 2010, request to initiate formal consultation for the Program on June 24, 2010. We sent an acknowledgement letter on September 23, 2010, requesting more information on certain aspects of the consultation. Service biologist Heather Abbey met with Lisa Thompson of Sustainable Conservation and Margy Lindquist of NRCS on September 23, 2010, to discuss the additional information requested. We received Daniel Mountjoy's January 26, 2011, letter amending the original formal consultation request on January 28, 2011. We requested time extensions for completing the biological opinion on May 10, 2011, and July 26, 2011. We received a response from Trudy Ingram of Ingram Environmental Consulting and Sustainable Conservation, indicating that the NRCS was willing to grant an extension. Ms. Abbey and Ms. Lindquist had another conference call on August 8, 2011, to discuss the consultation and the possibility of changing some of NRCS' determinations for the potential effects of the Program on several species and critical habitat. On August 29, 2011, we received correspondence from Daniel Mountjoy of NRCS; on January 25 and March 28, 2012, we received correspondence from Margy Lindquist of NRCS; and on February 18 and April 4, 2014, we received correspondence from Tom Moore of NRCS; all requesting changes to the NRCS' effects determinations. Those revisions, other "no effect" and "not likely to adversely affect" determinations, and associated avoidance measures are reflected in the following paragraphs.

No Effect Determinations

The NRCS determined that the proposed Program would have no effect on the federally threatened southern sea otter (*Enhydra lutris nereis*); the western snowy plover (*Charadrius nivosus nivosus*) and its critical habitat; or the federally endangered California sea-blite (*Suaeda californica*), salt marsh bird's beak (*Cordylanthus maritimus* ssp. *maritimus*), Smith's blue butterfly (*Euphilotes enoptes smithi*), California clapper rail (*Rallus longirostris obsoletus*), California least tern (*Sterna antillarum browni*), arroyo toad (*Anaxyrus californicus*) or Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*). The NRCS also determined that the proposed Program would have no effect on designated critical habitat for the Morro Bay kangaroo rat (*Dipodomys heermanni morroensis*) or California condor (*Gymnogyps californianus*). In San Luis Obispo County, all of these species and the associated critical habitat units occur in the ocean; on dunes and/or otherwise in the coastal strand; or in LPNF. These areas are outside the scope of the Program and Program activities will not occur in these areas. In addition, the arroyo toad and Tipton kangaroo rat are not currently known to occur in the County. If any of these

species or their critical habitat are located in a project area and cannot be avoided, the NRCS will initiate separate consultation with the Service for that particular project.

Section 7(a)(2) of the Act and its implementing regulations (50 CFR 402) do not require our concurrence with a "no effect" determination made by a Federal agency. Consequently, we have no additional comments with regard to your determination that the proposed actions would have no effect on these listed species or critical habitat.

May Affect, Not Likely to Adversely Affect Determinations - Species

In your consultation request, you requested our concurrence with your determination that the proposed Program may affect, but is not likely to adversely affect: the federally endangered California condor, Chorro Creek bog thistle (*Cirsium fontinale* var. *obispoense*), La Graciosa thistle (*Cirsium loncholepis*), Morro manzanita (*Arctostaphylos morroensis*), California jewelflower (*Caulanthus californicus*), Gambel's watercress (*Nasturtium gambellii*), Indian Knob mountainbalm (*Eriodictyon altissimum*), marsh sandwort (*Arenaria paludicola*), Nipomo Mesa lupine (*Lupinus nipomensis*), San Joaquin woolly-threads (*Monolopia congdonii*), and Morro Bay kangaroo rat; and the federally threatened Camatta Canyon amole (*Chlorogalum purpureum* var. *reductum*) and purple amole (*Chlorogalum purpureum* ssp. *purpureum*). We analyze each of these determinations below.

The NRCS proposed species-specific measures to avoid adverse effects to these species. These measures are listed with the associated species in the paragraphs below. If any of these species or their critical habitat are located in a project area and adverse effects cannot be avoided as described in the avoidance measures below, the NRCS will initiate separate consultation with the Service for that particular project.

<u>California condor</u>
California condors may be affected by habitat disturbance, presence of humans, and/or construction noise during Program activities; however, we concur with your determination that the proposed Program is not likely to adversely affect the California condor. Our concurrence is based on the following:

1. In the unlikely event a condor is observed on the ground or on something touching the ground (e.g., tree) within 300 feet of a project area, work will cease until the individual leaves on its own accord.
2. Most of the proposed practices would be implemented in agriculture fields, orchards, and streams that are unlikely to provide feeding, breeding, or sheltering opportunities for California condors;
3. Projects would disturb relatively small areas of potential California condor foraging habitat (e.g., grazing rangeland) but would not adversely affect condor foraging resources (i.e., carrion). The majority of proposed practices would temporarily disturb 5 acres or

less per project which is insignificant given an individual California condor's normal homerange;

4. Nearly all potential impacts to California condor foraging habitat would be temporary, and we do not expect the permanent installation of ponds (0.5 acre max for new ponds), sediment basins (0.5 acre max), and tailwater recovery basins (0.5 acre max) to adversely affect California condors. The size of these ponds and basins are insignificant relative to the size of a California condor homerange. In addition, ponds and basins are potential water sources for condors and mammal species that provide food for condors.
5. California condors are known to pick up "microtrash" that has been shown to result in injury and mortality when ingested. To avoid the impacts of microtrash, the NRCS will ensure that all construction debris and other trash (including such small items as screws, nuts, washers, nails, coins, rags, small electrical components, small pieces of plastic, glass or wire, and anything that is colorful or shiny) shall be covered or otherwise removed from a project site at the end of each day or prior to periods when workers are not present at the site; and
6. Projects implemented under the proposed Program would take a short time to complete, making it unlikely a California condor would occur in a project area during project activities.

Eleven Listed Plants

We concur with your determination that the proposed Program may affect, but is not likely to adversely affect the Chorro Creek bog thistle, La Graciosa thistle, Morro manzanita, California jewelflower, Gambel's watercress, Indian Knob mountainbalm, marsh sandwort, Nipomo Mesa lupine, San Joaquin woolly-threads, Camatta Canyon amole, or purple amole. Our concurrence is based on the following avoidance measures proposed by the NRCS:

1. A qualified individual will survey potential project sites for the 11 aforementioned plant species according to the Service's Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants (http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/botanicalinventories.pdf) and the Service's supplemental survey methods for California jewelflower found at http://www.fws.gov/sacramento/es/Survey-Protocols-Guidelines/Documents/rare_plant_protocol.pdf.
2. If any of these species are identified during surveys, they will not be disturbed. The NRCS will use flagging or temporary fencing to establish at least a 30-foot radius buffer around individuals of these species. Project-related activities will not occur within the buffer.
3. A qualified individual will monitor construction activities to ensure that the buffer zone and other proposed protections are implemented and that personnel and construction equipment do not encroach into the buffer.
4. No herbicides or fertilizers will be used in conjunction with the Program within the 30-foot buffer zone. Herbicides or fertilizers will not be used upwind of the buffer zone when conditions would cause herbicide or fertilizer to be blown into the buffer zone.

5. Grading within a project site, if required for conservation practice installation, will not alter surface and subsurface hydrologic processes to the detriment of these species.
6. If the NRCS or Service determines that a given project cannot totally avoid direct and indirect impacts to listed plants, the project will not be allowed to proceed at that location.

Morro Bay kangaroo rat

The CDFG designated the Morro Bay kangaroo rat as a Fully Protected species. California State law prohibits hunting, pursuit, catching, capture, or killing of this species under nearly all circumstances. The Morro Bay kangaroo rat could be affected by habitat disturbance, presence of humans, and/or construction noise and vibration during Program activities; however, we concur with your determination that the proposed Program may affect, but is not likely to adversely affect the Morro Bay kangaroo rat. Our concurrence is based on the following:

1. It is highly unlikely that the Morro Bay kangaroo rat would occur in a project area, because (1) despite repeated surveys, the Morro Bay kangaroo rat has not been observed since 1986, and (2) the species' historical habitat falls largely within the coastal strand, outside the scope of the Program.
2. If projects are within potential Morro Bay kangaroo rat habitat, the NRCS will assume presence of the species or conduct protocol surveys (Service 1996) no more than 30 calendar days prior to the start of construction.
3. Surveys for burrows and other sign will be conducted by a Service-approved individual with demonstrated experience in identifying kangaroo rat burrows.
4. If a Morro Bay kangaroo rat is located within a project area, the NRCS will halt the project and contact the Service to determine if, and under what conditions, the project will proceed.

May Affect, Not Likely to Adversely Affect Determinations - Critical Habitat

You determined, and requested our concurrence, that the Program may affect, but is not likely to adversely affect designated critical habitat for the tidewater goby.

Tidewater goby

The Service published a final rule revising tidewater goby critical habitat on February 6, 2013 (78 FR 8745). The rule includes thirteen units (including the Santa Maria River estuary) of critical habitat designated for the tidewater goby within the County. The critical habitat rule designated lagoons/sloughs/estuaries but included very little upstream habitat. The Program may affect tidewater goby habitat upstream of lagoons/sloughs/estuaries; however, lagoons/sloughs/estuaries are outside the scope of the Program. Critical habitat for the tidewater goby could be indirectly affected through temporary sediment inputs and/or improvement in water quality; however, we concur with your determination that the proposed project may affect, but is not likely to adversely affect critical habitat of the tidewater goby. Our concurrence is based on the following:

1. The waterbodies that constitute tidewater goby critical habitat (lagoons, sloughs, estuaries) are outside the scope of the Program.
2. The NRCS proposed measures to minimize sediment inputs to waterways as a result of Program activities. This should prevent or minimize impacts to downstream critical habitat units.
3. All proposed riparian projects are limited in size according to the measures outlined in the BA for the Program (e.g., 0.05 acre maximum for riparian vegetation trimming, 0.5 acre maximum for barrier removal, 5 acres maximum for restoration activities). The size limits should minimize the amount of sediment that could be introduced to a given waterway.
4. We expect any sediment inputs to waterways as a result of these projects would be relatively small and would not damage PCEs for the tidewater goby.
5. Although Program activities may cause short-term, temporary disturbance and/or introduce sediment inputs to tidewater goby critical habitat, the intent of the Program is to reduce erosion and improve water quality in the watershed. We expect the Program to have long-term, positive effects on the quality of tidewater goby critical habitat.

We prepared this response using the biological assessment (NRCS 2010) supporting your consultation request; telephone and electronic correspondence with staff from the NRCS, the Upper Salinas-Las Tablas Resource Conservation District, and Lisa Thompson of Sustainable Conservation; and information in our files. A complete decision file for this biological opinion can be made available at the Ventura Fish and Wildlife Office.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Program Overview

The NRCS, in coordination with the RCDs, proposes to assist landowners in San Luis Obispo County by providing funding and permitting assistance to those wishing to restore and enhance natural resource conditions on their properties. While the RCDs would lead development and implementation of projects under the Program, the NRCS would retain discretionary authority over projects implemented under the Program through funding and a "Cooperator Agreement" with participating landowners. The NRCS and the RCDs would cooperatively maintain oversight of all individual projects through the planning, implementation, and monitoring phases of the Program. The NRCS and the RCD would provide technical and cost-share assistance to participating landowners (cooperators), ensure compliance with proposed protective measures and permit conditions, and provide annual reports to the Service and other regulatory agencies. All landowners participating in the Program are required to sign a "Cooperator Agreement" which is also signed by the NRCS and the RCDs. In signing the Cooperator Agreement, the landowner commits to abide by the specifications of the permits and agreements issued by the regulatory agencies authorizing activities under the Program. If the landowner fails to perform according to the specifications outlined in the Cooperator Agreement, the NRCS has the authority to remove the landowner from the Program and activities carried out by the landowner would no longer be authorized under the Program.

The NRCS designed the Program to coordinate with multiple regulatory agencies (i.e., Army Corp of Engineers, National Marine Fisheries Service, California Department of Fish and Wildlife, Central Coast Regional Water Quality Control Board, California Coastal Commission, County of San Luis Obispo, etc.) to ensure compliance with agency mandates while offering a more accessible permitting procedure to agricultural and rural landowners. This Program is modeled after the previously-developed Santa Cruz County, Salinas River, Elkhorn Slough, and Morro Bay Watershed Permit Coordination Programs. Under the proposed Program, regulatory agencies would conduct programmatic evaluations of 18 specific, standardized, conservation practices that are intended to improve habitat, water quality, and soil stability on farms, ranches, and other rural properties.

Projects under the Program would be relatively small in size, demonstrate a net environmental benefit to the species and habitats in the area, and would consist of erosion control or restoration activities in and around waterways throughout San Luis Obispo County. The Program area encompasses mostly private lands along waterways, associated tributaries, and adjacent uplands primarily within five major watersheds in San Luis Obispo County, including Estero Bay, the Upper Salinas River, Estrella River, Santa Maria River, and Carrizo Plain. The Program would be implemented for at least five years and may be extended for an additional five years.

NRCS Planning Process

To ensure that project activities are in compliance with Federal and State laws, the NRCS proposes to implement a rigorous planning process before offering assistance to potential cooperators. The NRCS proposes the following nine-step planning process to customize a management plan unique to the conditions of the local property and its owner/manager:

1. Hold a consultation with the cooperator to identify resource problems on the property;
2. Determine and document the cooperator's objectives;
3. Inventory the soil, water, air, plant, animal, and human resources at project sites;
4. Analyze resource data to determine the anticipated positive and/or negative impacts on the resources identified in step 3;
5. Formulate alternative solutions which result in a significant positive improvement in all resource problem categories;
6. Evaluate alternative solutions compared to current management conditions;
7. The Cooperator determines the course of action by selecting the optimal set of conservation practices to maximize resource protection and enhancement. The NRCS prepares/approves a conservation plan;
8. Cooperator implements conservation practices with NRCS support according to recommended design, standards, and specifications; and
9. Evaluate results and effectiveness of the plan, making adjustments as needed.

Notification and Communication Procedures

1. Each spring, or at least 45 days prior to the scheduled start of ground disturbance for Program projects, the NRCS will send a pre-construction notification to the Service. The notification will consist of a description of the project location(s), which tier (described below) the project(s) falls under and why, the project and site description(s), purpose or need (including environmental benefits), approved practices to be installed and extent of the project(s), and summary of any survey results or listed species assumed to be present for each of the proposed projects for that construction season. The notification will consist of site-specific information for each of the known proposed projects for that construction season. The NRCS would submit additional pre-construction reports for subsequently proposed projects.
2. The Service will provide NRCS with comments including additional, site-specific, protection measures, if applicable, within 30 days of receiving the notification. The Service may also request site visits at this time.
3. The Service and other permitting agency staff will have the final authority to determine whether a project is appropriate for inclusion under the Program.
4. The NRCS will provide the Service with informal mid-construction season project status reports, as appropriate. Reasons for such reports include, but are not limited to, highlighting the results or challenges of a particular project, providing notable species-

specific information, and notifying the Service of additional conservation or partnership opportunities.

5. The NRCS will also provide the Service with an annual report including the status and results of all projects enacted under purview of this biological opinion. The report will list participating land owners, describe the purpose of each project, the nature and extent of disturbance, and natural biological enhancements. The report will list conservation benefits and any net gains in wetlands and riparian areas, describe actions taken to avoid adverse effects to listed species, provide photo documentation of "before and after" site conditions, and provide an update on the status of any projects that are being maintained and monitored annually. The NRCS will submit the annual report to the Service by January 31 of each year.

Conservation Practices

The NRCS proposes to use 18 standard conservation practices through the Program. A practice could be implemented individually, or two or more interrelated practices could be implemented under one project. Each of the conservation projects would be ranked with a four-tier system dictating which environmental protection measures (EPM) would be applied based on the level of impact that the project is expected to have on the environment. Projects with the least impact would be placed in Tier I; those within a riparian corridor would be placed in Tier II; any project that has the potential to negatively impact listed species or their habitat, designated critical habitat, and/or cultural resources would be placed in Tier III; and Tier IV projects would include those that have work proposed within the stream corridor that require rock stream bank protection, grade stabilization structures, or replacement/repair of stream crossings. Tiers are additive, thus each tier not only includes the protection measures specified for that tier, but also all of those specified for the lower tiers.

The NRCS proposes an unspecified number of projects in unspecified locations, but estimates that approximately 20 practices in the uplands and 32 practices in riparian areas would occur annually over the 5-year duration of the program. The NRCS anticipates that proposed projects would be limited in size based on typical projects installed during the past 10 years. The NRCS has proposed maximum thresholds (i.e., length, width, area, volume, etc.) for disturbance associated with each practice (Tables 1 and 6 of the BA). Detailed discussions of all 18 types of practices can be found in Table 1 of the BA (NRCS 2010); however, brief definitions and descriptions are as follows:

1. *Access Road Improvements*

The NRCS and/or cooperator would improve existing agricultural roads as part of a conservation plan. No new roads would be established. Roads would be improved (e.g., graded, drainage structures installed, etc.) to move livestock, produce, or equipment, or to improve access for property management while controlling runoff to prevent erosion. Water quality would also be maintained or improved. Examples of techniques employed are re-grading, outsloping, or

installing waterbars or rolling dips for erosion control. This practice may also be used to repair or remove culverts that occur in non-fish-bearing streams associated with access roads being improved or to relocate an access road to provide a setback from a riparian corridor. Improvements carried out under this practice will not be done to accommodate new development, future non-agricultural development, or intensification of land use. The NRCS and/or cooperator would implement sound engineering practices to ensure that the road meets the requirements of its intended use and San Luis Obispo County standards for agricultural roads.

Drainage would be addressed by providing drainage structures (i.e., culverts, bridges, or grade dips) dependent on the runoff conditions. Roadside ditches, water breaks, water bars, or drop inlets may be used to control surface runoff when necessary. Road improvements would be modeled after the *Handbook for Forest and Ranch Roads: A guide for planning, designing, constructing, reconstructing, maintaining, and closing wildland roads* (Weaver and Hagens 1994).

2. Diversion Structures (Upland Flow Interceptors)

Diversion structures would consist of excavated earth channels constructed across a slope to redirect excessive surface flow. This practice would not result in a reduction in flow of surface waters, involve the diversion of water from a waterway, or prevent entry of upland water into a wetland by changing the hydrology. Diversion structures would help stabilize hillsides by reducing the length of slope and thereby reducing excessive erosion and the formation/ continuing erosion of gullies. This practice is intended to reduce the amount of sediment and related pollutants delivered to surface waters. Generally, this is accomplished by delivering the excessive flow to a flat or vegetated area where flow velocities are slowed before discharging into a stream area or wetland. If a diversion discharges directly into a natural drainage, energy dissipaters would be designed and installed to prevent erosion. Additionally, angular rock and vegetation would be installed as necessary to reduce channel erosion.

3. Filter Strips

This practice would involve planting a strip of vegetation at the edges of cropland, grazing land, or disturbed areas as a buffer between these land uses and environmentally sensitive areas. The practice is intended to remove sediment, organic matter, and other pollutants from runoff and wastewater. Coarse-grained sediments in surface runoff are deposited along the filter strip. Additionally, pesticides and nutrients may be removed from runoff through infiltration, absorption, adsorption, decomposition, and volatilization, thereby enhancing water quality downstream. Filter strips may also reduce erosion in the area where they are constructed and often enhance the habitat for wildlife and beneficial insects. Only native vegetation or non-invasive, sterile annual non-native vegetation will be used.

4. Grassed Waterways

A grassed waterway is a natural or constructed, earthen channel or swale (typically on cultivated land and ditches adjacent to cultivated land) established with suitable vegetation for the conveyance of surface runoff from diversions, terraces, or other concentrated water sources. This practice is intended to slow the speed of runoff, thereby reducing erosive trenching and gullies. Grassed waterways also act as a filter in removing sediment and pollutants that would otherwise be delivered to waterways, riparian area, and wetlands. The NRCS would ensure that grassed waterways installed under the Program would not divert water out of the natural sub-watershed.

5. Irrigation System and Tailwater Recovery

This practice would be used to capture irrigation water, provide temporary water storage for agricultural uses, and redistribute the water back to the system for reuse. The storage basin prevents runoff laden with sediment, nutrients, and other chemicals from entering a natural waterway, riparian area, or wetland. Use of this practice would help to both conserve water and improve offsite water quality.

The NRCS would ensure that (1) nutrient and pest management measures for crops will be planned and implemented to limit chemical-laden tailwater as much as practical; (2) storage basins are sufficiently large to provide adequate retention time for the breakdown of chemicals contained in the tailwater; and (3) the cooperator uses natural soil liners, commercial liners, or other approved methods to minimize seepage of chemical-laden water from a storage facility.

6. Pipeline Installation

This type of project would install a pipeline, typically in an upland area, to convey water from a source to points of use. This practice is intended to shift the impacts of livestock from riparian areas to constructed water sources, reducing bank erosion, sediment yield, and manure in waterways. Pipeline installation typically has a long, but narrow, project footprint, and installation activities proceed quickly along the pipeline route. The pipe could be installed above ground, or a tractor or small bulldozer would be used to pull a 2-inch wide shank through the soil and concurrently install a pipe to a maximum depth of 18 inches. The trench is driven over with the tractor tire, which buries the pipe and closes the trench. The entire process is generally done with the same piece of equipment.

If the pipeline must cross a stream, the NRCS would ensure that the pipeline is either buried to an appropriate depth to maintain channel and bank stability, or suspended over the stream in a way that would avoid impacts to riparian vegetation.

7. Pond Improvements

This practice involves the restoration and maintenance of existing off-channel agricultural water impoundments by removing sediment and repairing spillways and embankments. This practice would not be used to construct new ponds or increase the water storage capacity of an existing pond. Pond maintenance and improvement serves as a part of a grazing management system that provides alternative water sources for livestock, keeping them out of riparian areas. Additionally, it is expected that this practice would help to maintain habitat for many native species including branchiopods, amphibians, and migratory birds.

8. Sediment Basins

Under this practice basins would be constructed to collect and store debris or sediment at sites where physical conditions or land ownership prevents treating the source of the sediment by installing erosion control measures. This practice may also involve designing the sediment basin to control the volume of water leaving a site and releasing the water at a natural rate of flow. Basins would typically be constructed at the base of agricultural lands where runoff and sediment would otherwise degrade water quality and habitat conditions in natural drainages or riparian areas. This practice is not intended to treat the source of sediment, but to provide a barrier to reduce the degradation of surface water quality downstream.

The NRCS would ensure that (1) new sediment basins are not constructed in stream channels or other natural water bodies; (2) new basins are placed outside riparian zones; (3) basins are designed to release water slower than the rate of storm flow; (4) appropriate energy dissipaters are installed to slow velocities and prevent scour at the point of discharge, and (5) a filter strip is installed around the basin perimeter.

9. Underground Outlets

This practice would involve installing conduit beneath the surface of the ground to collect surface water and convey it to suitable outlets. Excess surface water from farm land on steep terrain would be collected and conveyed to a sediment basin by installing pipelines underground. Location, size, and number of inlets would be selected to collect excess runoff and prevent erosive surface flow. This runoff would then be discharged to a sediment basin or grassed waterway where high velocity runoff is calmed and suspended sediment is trapped and settled prior to releasing water into a natural drainage channel. Appropriate energy dissipaters would be installed to slow velocities and prevent scour where a pipe outlets directly into a stream.

10. Stream Channel Stabilization

This practice is intended to address damaging aggradation (sedimentation) or degradation (scour) of a waterway that cannot be controlled through upland/upstream practices alone. Channel stabilization measures are designed to avoid detrimental erosion or sedimentation up- and

downstream; would not impair floodplain function; would not cause detrimental changes to watershed hydrology and sedimentation; and would not result in adverse effects on stream or stream corridor function. The NRCS or cooperator may also remove sand or sediment that is plugging the channel due to a large storm event or bank failure; however, the NRCS would only allow this measure one time at any given location. Structures placed in fish-bearing streams would accommodate fish passage.

11. Grade Stabilization Structures

Projects of this type would build structures into natural or artificial channels (such as a gully or stream) to control grade, accommodate elevation changes, and prevent channel incision. This practice would utilize rock, timber, or vegetation structures, such as a brush mattress, placed to reduce the flow velocity (and thereby reduce erosion) above and below the structure. This practice is intended to decrease sediment yield and improve downstream water quality. These structures would be part of an integrated channel stabilization plan. Grade stabilization structures would not impede wildlife movement, and structures placed in fish-bearing streams would accommodate fish passage. Structures would only be installed when other channel stabilization measures are not feasible.

12. Stream Habitat Improvement and Management

This practice is designed to maintain, improve, or restore the physical, chemical, and biological functions of a stream. The NRCS/cooperator would use this practice to increase the quality of aquatic habitat in steams where habitat deficiencies limit survival, growth, reproduction, and/or diversity of aquatic species in relation to the potential of the stream. As part of this practice, the NRCS/cooperator may (1) remove fish passage barriers, (2) add features that create habitat for steelhead (e.g., rock weirs, boulder clusters, root wads), and (3) plant native riparian vegetation on stream banks.

The NRCS would design and implement stream habitat improvement and management projects in accordance with the *California Salmonid Stream Habitat Restoration Manual* (CDFG 2002) and in coordination with the appropriate agencies. This manual is hereby incorporated into this description of the proposed action by reference. Dewatering may be necessary and would involve isolating the work area using temporary structures (e.g., sandbag cofferdams) and pumping water around the worksite.

13. Stream Bank Protection

This practice would involve using vegetation or structures to stabilize and protect banks of streams or constructed channels against scour and erosion. This practice is intended to reduce the amount of sediment and pollution delivered downstream, improve habitat for fish and wildlife, and protect adjacent land from erosion damage. This practice would be applied to natural or excavated channels where stream banks are susceptible to damage from erosion,

livestock, or vehicular traffic. A site assessment would be performed to determine the cause of the instability, to ensure that the measures implemented would correct the problem in its entirety and consider potential long-term changes within the channel. In most cases, the streambed grade would need to be controlled before permanent bank protection could be implemented. Sites will be planted with native vegetation where possible. In some cases, installation of root wads, weirs, or rock rip-rap may be necessary; however, rock rip-rap would only be used when there are no other feasible options.

14. Structures for Water Control

Where appropriate, the NRCS/cooperator would install a structure that conveys water, controls the direction or rate of flow, or maintains a desired water surface elevation in an irrigation ditch, drainage, or other water management system to control erosion and prevent down-cutting of stream channels. This practice would be used to replace or retrofit existing culverts, including culverts that prevent fish passage, and to install new culverts where appropriate. Pipe drop inlets, pump boxes, and fish screens may also be installed under this practice, but structures would not be installed where they could impact wetlands or water-related wildlife habitats. Culvert design and selection would be consistent with the *California Department of Fish and Game's Culvert Criteria for Fish Passage* (CDFG 2003) and the *National Marine Fisheries Service's Guidelines for Salmonid Passage at Stream Crossings* (NMFS 2001).

15. Stream Crossing

This practice would involve installation of a stable crossing (i.e., culvert, bridge, ford) within a stream channel on agricultural land to allow access for people, livestock, equipment, or vehicles. This practice would be used to improve water quality by reducing sediment, nutrient, organic, and inorganic inputs to the stream and reducing erosion within the channel. Potential effects on fish and wildlife (i.e., barriers to movement), riparian vegetation, and the channel upstream and downstream of the proposed crossing would be evaluated based on the *Primer on Stream and River Protection for the Regulator and Program Manager* (Riley 2003) prior to implementation. This practice only would be used to replace existing structures, rather than to construct new stream crossings.

16. Debris Removal and Vegetation Management

This practice would remove and dispose of debris, fallen trees, and other obstructions from waterways to restore flow capacity, or prevent excessive erosion or bank failure. This practice would only be implemented in conjunction with one or more of the other conservation practices defined under the Program and would not be used for routine flood control. Occasionally, selective trimming of willows and other vegetation would be needed to install other practices or prevent bank erosion. Dewatering the project area may be necessary when conducting this practice.

The NRCS/cooperator would use handtools whenever possible to perform selective trimming; heavy equipment would only be used to remove large objects (e.g., concrete, cars) when crane access from the top of the bank is not possible. The practice would not remove native streambank vegetation, sediment from stream channels, and would not encourage channel straightening. Habitat-forming features that provide cover, food, pools, and water turbulence, when present, would be either retained or replaced to the extent possible.

17. Critical Area Planting

This practice involves establishing permanent vegetation on highly erodible areas and is used to stabilize the soil, reduce damage from sediment and nutrients in runoff to downstream areas, and improve wildlife habitat and visual resources. The NRCS/cooperator would typically use this practice after installation of other practices (e.g., stream bank protection).

When implementing or maintaining a critical area planting above the high water mark, workers would install a filter fabric fence, fiber rolls, and/or hay bales, if needed, to keep sediment from entering the adjacent water body. At the time vegetation is sufficiently mature to provide erosion control, it may be appropriate to remove the fence, fiber rolls, and/or hay bales. The NRCS proposes to implement and maintain planted areas so that sediment would not cover clean stream bottoms.

18. Restoration and Management of Declining Habitats

This practice would be used to restore terrestrial or aquatic habitat degraded by human activity, provide habitat for rare and declining wildlife species by restoring and conserving native plant communities, increase native biodiversity onsite, and manage unique or declining native habitats. This practice may be used to replace invasive plant species with natives and may also include elements of a prescribed grazing management system such as stockwater development, fencing, and pond construction designed to protect riparian habitat quality and benefit targeted species. The NRCS would use handtools to remove invasive plant species, and any use of herbicides would follow approved manufacturer protocols and limitations by regulatory agencies.

Installation of fencing has a long, but narrow, project footprint, and installation activities proceed quickly along the fence route. Typically, fence posts (t-posts) are installed with hand held post drivers, although a post driver mounted on an all-terrain vehicle (ATV) is occasionally used in rugged country. Hand held augers are used when installing corner posts or posts used to adjust to variations in topography. An auger mounted on a tractor, a rubber-tired bobcat, or an ATV is rarely used to dig holes for the larger posts. When one of these vehicles is necessary, the driver moves the equipment along in a linear approach to each posthole location with a minimum disturbance to the soil, and with little to no need for additional movement around the post site.

Conservation Measures

General Environmental Protection Measures

Under the Program, The NRCS proposes to implement environmental protection measures (EPMs) to avoid, minimize, and monitor potential impacts of the Program on sensitive species and their habitats, natural/cultural resources, and air/water quality. The EPMs would be mandatory and incorporated into all projects under the Program. The Program would use a tiered approach to streamline how the EPMs would be organized and applied. Using this "Tiered Impacts Decision Tool" (Figure 1 of the BA), projects would be placed into one of four tiers, based on impact level. Projects having the fewest impacts are placed in Tier I; those with the greatest potential impacts are placed in Tier IV. As tiers increase, so do the number of required EPMs. Tiers are additive, meaning that EPMs required for lower tiers are automatically included for projects qualifying at higher tiers. For example, the NRCS would require a project with Tier III impacts to also implement the EPMs contained in Tiers I and II, as applicable. In considering the tiered system, a cooperator would have the option of reducing the scope of their projects in order to qualify for a lower tier. The following are general descriptions of the types of projects that would qualify under each tier:

Tier I: All the practices performed in uplands and where no listed species or critical habitat would be impacted fall into Tier I; if listed species or habitat, critical habitat, and/or cultural/historic resources could be affected in upland areas, practices/projects are automatically placed in Tier III; no work is performed in streams under this tier.

Tier II: Practices performed within the stream corridor where no listed species or critical habitat would be impacted AND which do not require rock streambank protection, grade stabilization structures, or replacement/modification of stream crossings, fall into Tier II.

Tier III: Practices performed where listed species or habitat, critical habitat, and/or cultural/historic resources could be impacted AND which do not require rock streambank protection, grade stabilization structures, or replacement/ modification of stream crossings, fall into Tier III.

Tier IV: Practices performed within stream corridors that require rock streambank protection, grade stabilization structures, or replacement/modification of stream crossings fall into Tier IV.

The BA (Table 3) displays the EPMs in a grid comparing each of the four tiers with a list of project components (i.e., various project stages or impact mechanisms that may occur during implementation of a project). The NRCS would match a given project component with the corresponding tier, to determine which EPMs would be implemented for that project. The following project components are listed in the EPM grid:

1. Site Conditions—Work in streambed, channel, or bank, including riparian habitat;
   a. Site disturbance limitations;
   b. Equipment limitations; and
   c. Water quality protections including erosion control, contamination prevention, and pesticide/herbicide application restrictions.
2. Temporary dewatering/water diversions;
3. Stream bank protection, grade stabilization structures, or removal of large structures for habitat improvement;
4. Surveys (e.g., breeding birds) and Monitoring (e.g., on-site monitoring for impacts to wildlife, effectiveness of minimization measures, etc.);
5. Timing—seasonal work restrictions;
6. Planning—project design using the NCRS' 9-step planning process and other appropriate manuals and primers;
7. Training regarding minimization measures for biological and cultural resources, and sensitive species and habitats for all personnel involved in a project;
8. Notification and Reporting to the Service and other appropriate agencies.

Species-Specific Conservation Measures

In addition to the general conservation measures proposed above, the NRCS is also proposing species-specific conservation measures for the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, least Bell's vireo, Morro shoulderband snail, and tidewater goby.

Protective Measures for the California Red-legged Frog

1. In areas where the California red-legged frog may occur, construction will avoid the known breeding and active periods for the species, from November (or the first rain event) through April.
2. If a practice must be installed in aquatic habitat where California red-legged frogs may be present, a Service-approved individual will conduct pre-construction surveys. If California red-legged frogs are found within the project area, the Service-approved individual will capture and relocate California red-legged frogs to suitable habitat using approved protocols and ensure that they cannot re-enter the construction site from up- or downstream.
3. A Service-approved individual will be present onsite to monitor all grading, trenching, and other ground-disturbing activities.
4. The boundaries of each work area will be clearly defined and marked with visible flagging or fencing prior to the start of construction.
5. If dewatering of a stream is required using a pump, screens (no larger than 0.25-inch mesh size) will be installed on pumps to prevent entrapment of California red-legged frogs; pump screens will be installed with any practice where the potential for entrapment exists (e.g., irrigation system and tailwater recovery).

6. To minimize transfer of diseases, NRCS will implement (or require implementation of) the *Declining Amphibian Populations Task Force Fieldwork Code of Practice* (Appendix 1).
7. All construction equipment will be staged, repaired, and maintained at least 60 feet outside the riverbed, wetlands, and riparian corridor.
8. The construction contractor will develop and implement a spill containment plan and a schedule of their proposed activities at least 48 hours before construction begins.

Protective Measures for the California Tiger Salamander

1. Work is not allowed in vernal pools; hydrologic processes will not be impacted by work adjacent to a vernal pool or vernal pool complex.
2. In areas where the California tiger salamander may occur, construction will avoid the known breeding and active periods for the species, which include November (or the first rain event) through August for ponded habitat and November (or the first rain event) through March for upland habitat. These seasonal work restrictions may be adjusted on a case-by-case basis pending coordination with the Service.
3. The NRCS/cooperator would avoid rodent burrows to the maximum extent possible, especially within 1.2 miles of potential California tiger salamander breeding habitat.
4. A Service-approved individual will carefully search all obvious potential hiding spots for California tiger salamanders in upland areas within the project site, such as large downed woody debris, prior to beginning construction activities. Any California tiger salamanders found within these upland areas will be captured and released in suitable habitat outside of the construction area. Any individuals captured will be held for the minimum amount of time necessary.
5. Prior to California tiger salamander relocation activities at a project site, the Service-approved biologist will identify a nearby site with upland habitat suitable for California tiger salamanders (i.e., an area that includes small mammal burrow complexes with active small mammal colonies).
6. If a California tiger salamander is observed or encountered within a designated work area and cannot be avoided, all work will stop until the animal leaves the work area or until it is captured and relocated to outside of the work area by a Service-approved individual.
7. A Service-approved individual will be present onsite to monitor all grading, trenching, and other ground-disturbing activities.
8. Any trenches left open overnight will be equipped with escape ramps and will be inspected by a Service-approved individual within two (2) hours of sunrise each morning (including weekends and days when construction does not occur) to remove any California tiger salamanders that may have inadvertently entered the trench and been unable to exit.
9. The project area will be staked and flagged with material that is highly visible to equipment operators. Construction personnel and activities will not be allowed beyond the delineated area.

10. Construction activities will be conducted during daylight hours when California tiger salamanders are less active.
11. Project activities will not occur during any rain events.

Protective Measures for Listed Branchiopod Species

1. Work is not allowed in vernal pools; hydrologic processes will not be impacted by work adjacent to a vernal pool or vernal pool complex.
2. Project activities in seasonal wetlands that may provide fairy shrimp habitat will be conducted when the soil is dry to the touch at both the surface and one inch below. After any precipitation event of greater than 0.2 inches, project activities will only occur after the soil has dried sufficiently as described above, and no sooner than 48 hours after the rain event ends, unless otherwise approved by the Service;
3. In seasonal wetlands where listed branchiopod species may occur, all excavations would be refilled and restored to their original grade following completion of proposed project activities; and during excavations, the uppermost soil layer, which may contain fairy shrimp cysts, will be retained separate from deeper layers of soil and will be re-deposited atop each excavated site in order to minimize the lethal take of fairy shrimp cysts; and
4. A Service-approved individual will survey the proposed access routes and staging areas prior to the initiation of project activities and will flag the boundaries of vernal pool fairy shrimp habitat areas. Proposed access routes and staging areas will avoid identified vernal pool fairy shrimp habitat areas to the greatest extent feasible.

Protective Measures for the San Joaquin Kit Fox

1. Within 14 days prior to any new ground disturbances in potential kit fox habitat, a Service-approved individual will conduct surveys for San Joaquin kit fox in the project area and within 200 feet of the project boundary. Exclusion zones will be established around dens found by the Service-approved individual and clearly staked, encircled with cord or tape, or flagged.
2. For linear practices (pipeline and fencing (as part of restoration/management of sensitive habitats)), a Service-approved individual will conduct a survey within 100 feet of the project location.
3. No ground disturbance or vehicle traffic will be allowed within the exclusion zones. If an established roadway falls within the exclusion zone, vehicle traffic will be allowed only if a critical need exists and alternate routes are not available.
4. Exclusion zones will be based on the following criteria:
    a. Potential den – 100-foot radius. A potential den is defined as dens with entrances of sufficient size to allow use by San Joaquin kit foxes (5-inch or greater in diameter) and that occur in suitable habitat.
    b. Known den – 200-foot radius. A known den is defined as those that are currently inhabited by San Joaquin kit foxes or where they have been observed in the past.

c. Known natal or pupping den – 200-foot radius. A known natal or pupping den is defined as those where pregnant females or females with pups have been observed.

5. Disturbance to all known and potential San Joaquin kit fox dens will be avoided to the maximum extent practicable. San Joaquin kit fox dens that cannot be avoided will be surveyed by a Service-approved biologist for three days to determine if they are occupied by San Joaquin kit fox. To establish presence, activity at the den will be monitored by placing tracking medium at the entrance every morning. Tracking material will be checked twice a day; every morning for tracks and prior to sundown to ensure that the tracking materials have not been damaged or blown away.
6. If San Joaquin kit fox activity is not observed during monitoring, non-natal dens that are unavoidable and would be destroyed by the project will be physically closed to prevent occupation of the den.
7. If San Joaquin kit fox activity is observed at the unavoidable non-natal den during monitoring, the Service-approved individual will monitor the den until three consecutive days without San Joaquin kit fox activity occurs; at that point, the den will be physically closed;
8. If a natal den is discovered at a project site and cannot be avoided, the Service-approved individual will implement the following measures:
   a. The Service-approved individual will place exclusionary flagging in at least a 200-foot radius around the den to protect the den from project activities and disturbance.
   b. The Service-approved individual will monitor the den until the mother and pups have vacated the den for three consecutive days, at which point the Service-approved individual will clear and close the den, and the project may proceed.
9. If the Service-approved individual believes these measures are not adequate to minimize the likelihood of adverse effects, NRCS will stop work and contact the Service to determine how to proceed.

<u>Protective Measures for Kangaroo Rats including the Giant Kangaroo Rat</u>

1. If projects are within potential kangaroo rat habitat, NRCS will assume presence of the species or conduct protocol surveys for presence no more than 30 calendar days prior to the start of construction.
2. Surveys for burrows and other sign will be conducted by a Service-approved individual with demonstrated experience in identifying kangaroo rat burrows. The Service-approved individual will conduct surveys within a project area and within 200 feet of the project area boundary.
3. For linear practices (pipeline and fencing (as part of restoration/management of sensitive habitats)), a Service-approved individual will conduct a survey within 100 feet of the project location.
4. If giant kangaroo rats are located in or near a project area, the following measures will be implemented to minimize adverse effects:

a. Prior to moving pipes and culverts, a qualified individual will search them for giant kangaroo rats. If a giant kangaroo rat is located, the pipe or culvert will not be moved until the individual leaves on its own accord.
b. A 100-foot buffer or exclusion zone will be established around active burrows and precincts; project-related activities within the buffer zone are prohibited.
c. Ground disturbing activities in giant kangaroo rat habitat will be restricted to the period from May 15 to October 31 to avoid the typical breeding season for giant kangaroo rats.
d. To address the sensitivity of giant kangaroo rats to vibration, the NRCS will also prohibit mechanized construction vehicle and equipment activity within 200 feet of an active giant kangaroo rat burrow/precinct. The Service-approved individual may expand this buffer as necessary to minimize impacts.
e. Giant kangaroo rats are primarily nocturnal. To avoid direct impacts to individuals above ground, projects in potential giant kangaroo habitat will be conducted during daylight hours.
f. If erosion control fabrics are needed as part of a project, tightly woven fiber netting or similar material will be used to ensure that kangaroo rats do not become trapped. Coconut coir matting is one acceptable erosion control measure; however, no plastic mono-filament matting will be used for erosion control. This limitation will be communicated to the contractor through the use of special provisions included in the bid solicitation package.
g. If giant kangaroo rats are located within the action area, and the Service-approved individual or the NRCS determine that the preceding measures are insufficient to minimize adverse effects, NRCS will halt the project and contact the Service to determine how to proceed.

Protective Measures for the Blunt-nosed Leopard Lizard

1. If projects are proposed within potential habitat for blunt-nosed leopard lizards, the NRCS will assume presence of the species or have a Service-approved individual conduct protocol surveys (CDFG 2004) prior to the onset of project activities.
2. For linear practices (pipeline and fencing (as part of restoration/management of sensitive habitats)), a Service-approved individual will conduct a survey within 100 feet of the project area boundary. For other practices, the Service-approved individual will survey within 200 feet of the project area boundary.
3. Surveys for blunt-nosed leopard lizards, burrows, and other sign of the species will be conducted by a Service-approved individual with demonstrated experience in identifying the species' burrows and other sign.
4. If blunt-nosed leopard lizards, their burrows, or other sign of the species are found within a project area or survey zone, these measures will be implemented to minimize adverse effects:
    a. A 200-foot radius buffer or exclusion zone will be established around blunt-nosed leopard lizard observations, burrows, and egg clutch sites. The NRCS will

require a 100-foot exclusion zone for pipeline and fencing practices. Project-related activities within the buffer zone will be prohibited.

b. Blunt-nosed leopard lizards are only active during daylight hours when air temperature is between 77 and 95 degrees Fahrenheit. In temperatures outside this range, blunt-nosed leopard lizards are not likely to be active above ground. Therefore, ground disturbing activities in the species' habitat will only occur during daylight hours and within the specified temperature range. This measure maximizes the chance of the surveyor/monitor observing blunt-nosed leopard lizards and gives individual lizards the best opportunity to avoid Program activities.

c. Initial surface disturbing actions that occur during the blunt-nosed leopard lizard's active season (April through September) will be monitored by a Service approved individual. Should one or more blunt-nosed leopard lizards be discovered within project area boundaries after ground disturbance has started, project activities will cease until the lizard(s) vacate the area of their own accord. Alternatively, a Service-approved individual will attempt to "herd" the individual towards suitable habitat outside the project area. Capture, removal, or holding of blunt-nosed leopard lizards is not allowed under California State law. If the blunt-nosed leopard lizard does not vacate the project area, the NRCS will contact the Service to determine if, and under what conditions, the project will proceed.

d. Pipes and culverts will be searched for leopard lizards prior to being moved or sealed to ensure that an animal has not been trapped. If a leopard lizard is observed in a pipe or culvert, project activities will cease until the individual leaves on its own accord.

e. Trenches or pits open will be either covered or filled in at the end of the work day to prevent blunt-nosed leopard lizards from becoming trapped. The NRCS will ensure that covering of holes or trenches is done in such a way that lizards cannot get underneath the cover.

f. If the habitat surrounding a proposed project area is inadequate in size or content to support blunt-nosed leopard lizards, or if a proposed project would isolate occupied blunt-nosed leopard lizard habitat from a larger area of similar habitat, the project will not proceed. The NRCS will either relocate the project or contact the Service to determine if separate consultation is necessary.

g. If the Service-approved individual or the NRCS determine that the preceding measures are insufficient to minimize adverse effects to the blunt-nosed leopard lizard for a given project, the NRCS will contact the Service to determine if, and under what conditions, the project will proceed.

<u>Protective Measures for the Least Bell's Vireo</u>

1. If a project is proposed within potentially suitable habitat for the least Bell's vireo, either protocol surveys will be performed to determine presence/absence or presence will be

assumed. A Service-approved biological monitor will be onsite to perform pre-construction surveys and monitor all habitat disturbance.

2. Removal or disturbance of occupied (or presumed occupied) riparian habitat during breeding and nesting seasons, from March 15 to September 15, is prohibited.
3. Use of large construction equipment is prohibited within 500 feet of an active nest during the breeding and nesting season, March 15 to September 15. If a nest is initiated within 500 feet of construction activities after construction has begun, NRCS shall stop work and contact the Service to determine how to proceed.
4. Harvest of willow branches at any site with potential habitat is prohibited between March 15 and September 15; if harvesting occurs outside of this time window, such harvesting will be limited in extent to avoid compromising the survival of the entire tree.

Protective Measures for the Morro Shoulderband Snail

1. If projects would occur within potential habitat for Morro shoulderband snail, the NRCS will assume presence of the species or a Service-approved individual will conduct protocol surveys for the species no more than 30 calendar days prior to the start of construction. The Service-approved individual will relocate any Morro shoulderband snails observed in a project area to suitable habitat out of harm's way prior to construction activities.
2. Construction areas will be clearly marked with high-visibility flagging or barrier fencing. Construction equipment and personnel will remain within the marked areas.
3. A Service-approved individual will be retained to monitor all vegetation removal, grading, and ground-disturbing activities that will take place within habitat suitable for the Morro shoulderband snail. The monitor will be granted full authority to stop work at his or her discretion and will stop work if project-related activities occur outside the demarcated boundaries of the construction footprint. The monitor will stop work if any Morro shoulderband snails are detected within the proposed construction footprint and will relocate them to suitable habitat out of harm's way prior to construction activities resuming. If no suitable habitat opportunities are available in the immediate vicinity of the construction footprint, salvaged and relocated specimens may also be transported to an off-site location approved by the Service.

Protective Measures for the Tidewater Goby

1. Program activities are not permitted in estuaries or lagoons.
2. Installation of barriers to upstream migration by tidewater gobies (i.e., vertical drops of more than 3 inches) is not allowed under the Program.
3. If work is to be conducted in an area where tidewater gobies could occur, a Service-approved individual will conduct surveys for gobies prior to the onset of project activities. If tidewater gobies are found within the project area, a Service-approved individual will capture and relocate the gobies to suitable habitat using approved protocols and prevent re-entry of the species into the project site until project activities

have been completed. The Service-approved individual will monitor all vegetation removal, grading, and ground-disturbing activities throughout the duration of the project to ensure that all protective measures for this species are being implemented properly.

4. The work area boundaries will be clearly defined and marked with visible flagging or fencing prior to the start of construction activities.
5. If dewatering of a stream is required, pumps will be screened (with no larger than 0.25-inch mesh) to prevent entrapment of tidewater gobies.

Conservation Measures for Projects Occurring in Critical Habitat

During initial site assessments, the NRCS will determine if the project area is located within the critical habitat units designated for federally listed species. If work is performed within areas designated as critical habitat for the California red-legged frog, California tiger salamander, Morro shoulderband snail, La Graciosa thistle, or Camatta Canyon amole, these measures will be implemented to minimize adverse effects on critical habitat:

1. The NRCS will determine if any of the primary constituent elements, as defined in the critical habitat rule for each species, exist in the proposed project area.
2. The NRCS will implement species-specific minimization and avoidance measures described above for each species, based on which species and critical habitat areas occur or have the potential to occur within the project area.
3. The NRCS will not implement any practices in critical habitat that would cause permanent adverse impacts to the primary constituent elements (PCEs) of any critical habitat for listed plant species; however, the NRCS may implement practices (e.g., grade control structures, restoration and management of sensitive habitats) that have permanent positive impacts to critical habitat.
4. Staging areas will be confined to the smallest area possible as described above under the General Conservation Measures Section.
5. Whenever possible, project activities will include removal of non-native species from the project area.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

The jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species,* which evaluates the range-wide conditions of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, least Bell's vireo, Morro shoulderband snail, and tidewater goby, the factors responsible for those conditions, and the survival and recovery needs of these listed species; (2) the *Environmental Baseline,* which evaluates the conditions of the subject species in the action area, the factors responsible for those conditions, and the relationship of the action area to the

survival and recovery of these species; (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 subject; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the subject species.

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 current status of the subject species, 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 the subject 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 the subject species and the role of the action area in the survival and recovery of these species 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 Code of Federal Regulations (CFR) 402.02. Instead, we have relied on 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 designated critical habitat for the California red-legged frog, California tiger salamander, Morro shoulderband snail, La Graciosa thistle, and Camatta Canyon amole, in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (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 and interdependent activities on the PCEs and how that will influence the recovery role of the 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 critical habitat of the California red-legged frog, California tiger salamander, Morro shoulderband snail, La Graciosa thistle, and Camatta Canyon amole are evaluated in the context of the range-wide condition of the critical habitat, 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 subject species.

STATUS OF THE SPECIES AND CRITICAL HABITAT

California Red-legged Frog

The Service listed the California red-legged frog as threatened on May 23, 1996 (61 FR 25813) and published a recovery plan for the species in 2002 (Service 2002). On March 17, 2010, the Service published a revised critical habitat designation for California red-legged frog (75 FR 12816).

Detailed information on the biology of California red-legged frogs can be found in Storer (1925), Stebbins (2003), and Jennings et al. (1992). This species is the largest native frog in the western United States, ranging from 1.5 to 5.1 inches in length. The abdomen and hind legs of adults are tinted red; 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, and dorsolateral folds are prominent on the back. Tadpoles range from 0.6 to 3.1 inches in length and are dark brown and yellow with dark spots.

California red-legged frogs spend most of their lives in and near sheltered backwaters of ponds, marshes, springs, streams, and reservoirs. Deep pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha* spp.) are considered optimal habitat. Eggs, larvae, transformed juveniles, and adults have also been found in ephemeral creeks and drainages and in ponds that do not have riparian vegetation. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting population numbers and distribution. Some California red-legged frogs have moved long distances over land between water sources during winter rains. Adult California red-legged frogs have been documented moving more than 2 miles in northern Santa Cruz County “without apparent regard to topography, vegetation type, or riparian corridors” (Bulger et al. 2003). Most of these overland movements occur at night.

California red-legged frogs breed from November through March with earlier breeding records occurring in southern localities. California red-legged frogs are often prolific breeders, typically laying their eggs during or shortly after large rainfall events in late winter and early spring. Female California red-legged frogs deposit egg masses on emergent vegetation so that the masses float on the surface of the water. Egg masses contain about 2,000 to 5,000 moderate-sized (0.08 to 0.11 inch in diameter), dark reddish brown eggs. Embryos hatch 6 to 14 days after fertilization and larvae require 3.5 to 7 months to attain metamorphosis. Tadpoles probably experience the highest mortality rates of all life stages, with less than 1 percent of eggs laid reaching metamorphosis. Sexual maturity is normally reached at 3 to 4 years of age; California red-legged frogs may live 8 to10 years. Juveniles have been observed to be active diurnally and nocturnally, whereas adults are mainly nocturnal.

The diet of California red-legged frogs is highly variable. Invertebrates are the most common food items for adults, although vertebrates such as Pacific treefrogs (*Pseudacris regilla*) and California mice (*Peromyscus californicus*) can constitute over half of the prey mass eaten by larger frogs (Hayes and Tennant 1985).

The California red-legged frog has been extirpated or nearly extirpated from 70 percent of its former range. Historically, the species' range extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Jennings and Hayes 1985; Storer 1925). The species was historically found throughout the Central Valley and Sierra Nevada foothills, and despite four additional occurrences that have been recorded in the Sierra Nevada foothills since listing, its occurrence in those areas has become extremely limited (61 FR 25813). Currently, California red-legged frogs are known only from 3 disjunct regions throughout 26 California counties, and 1 disjunct region in Baja California, Mexico (Grismer 2002; Krofta 2003, Fidenci 2004).

The most secure aggregations of California red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack non-native predators. Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, Hayes and Jennings 1988). Ongoing threats to the species include habitat loss due to stream alteration and disturbance to wetland areas; indirect effects from expanding urbanization, competition or predation from non-native species; and chytrid fungus (*Batrachochytrium dendrobatidis*), a water-borne fungus that can decimate amphibian populations.

Recovery plan for the California red-legged frog

The 2002 final recovery plan for the California red-legged frog states that the goal of recovery efforts is to reduce threats and improve the population status of the California red-legged frog sufficiently to warrant delisting. The recovery plan describes a strategy for delisting, which includes (1) protecting known populations and reestablishing historical populations; (2) protecting suitable habitat, corridors, and core areas; (3) developing and implementing management plans for preserved habitat, occupied watersheds, and core areas; (4) developing land use guidelines; (5) gathering biological and ecological data necessary for conservation of the species; (6) monitoring existing populations and conducting surveys for new populations; and (7) establishing an outreach program. This species will be considered for delisting when:

1. Suitable habitats within all core areas are protected and/or managed for California red-legged frogs in perpetuity, and the ecological integrity of these areas is not threatened by adverse anthropogenic habitat modification (including indirect effects of upstream/downstream land uses);
2. Existing populations throughout the range, are stable (i.e., reproductive rates allow for long term viability without human intervention). Population status will be documented

through establishment and implementation of a scientifically acceptable population monitoring program for at least a 15-year period, which is approximately 4 to 5 generations of the California red-legged frog. This 15-year period will preferably include an average precipitation cycle;

3. Populations are geographically distributed in a manner that allows for the continued existence of viable metapopulations despite fluctuations in the status of individual populations (i.e., when populations are stable or increasing at each core area);
4. The species is successfully reestablished in portions of its historic range such that at least one reestablished population is stable/increasing at each core area where California red-legged frog are currently absent; and
5. The amount of additional habitat needed for population connectivity, recolonization, and dispersal has been determined, protected, and managed for California red-legged frogs.

California red-legged frog 5-Year status review

The Service has not completed a 5-year status review of the California red-legged frog.

Critical Habitat for the California Red-legged Frog

On March 17, 2010, the Service published a revised critical habitat designation for California red-legged frog (75 FR 12816); a total of 1,636,609 acres (as 48 units) were designated in 27 California counties. The current designation reflects the lands containing those essential habitat features necessary for the conservation of the California red-legged frog. A detailed discussion of the methods used in designating critical habitat can be found in the final rule.

All of the areas of revised critical habitat for the California red-legged frog are within the species' historical geographic range and contain PCEs to support at least one of the California red-legged frog's essential life history functions. Based on our current knowledge of the life-history, biology, and ecology of the California red-legged frog, we determined that the PCEs of California red-legged frog critical habitat consist of:

1. Aquatic breeding habitat consists of standing bodies of fresh water (with salinities less than 4.5 parts per thousand), including natural and manmade (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. Aquatic non-breeding habitat consists of the freshwater habitats described for aquatic breeding habitat, that may or may not hold water long enough for the subspecies to complete the aquatic portion of its lifecycle, which provide for shelter, foraging, predator avoidance, and aquatic dispersal habitat for juvenile and adult California red-legged frogs.
3. Upland habitat consists of areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat, up to a distance of one mile in most cases (i.e., depending on

surrounding landscape and dispersal barriers). Upland habitat may consist of various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees or logs), small mammal burrows, or moist leaf litter.

4. Dispersal habitat consists of accessible upland or riparian habitat within and between occupied or previously occupied sites located within one mile of each other, where movement is supported between such sites. Dispersal habitat includes various natural habitats and altered habitats (e.g., agricultural fields) that do not contain barriers to dispersal (e.g., heavily traveled roads without bridges or culverts). 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 lakes or reservoirs over 50 acres in size, or other areas that do not contain those features identified in PCE 1, 2, or 3 as essential to the conservation of the species.

Critical habitat for the California red-legged frog occurs over a large geographic area and is subject to varying degrees of disturbance. Many critical habitat units have been, and continue to be, degraded by direct and indirect impacts from human recreation activities, flood control maintenance activities, water diversions, mining, dredging, sedimentation, water chemistry or temperature alterations, overgrazing, habitat removal, and nonnative plant introduction. However, some critical habitat that experiences livestock grazing has been augmented by maintenance of stockponds, which potentially provide PCEs including potential breeding, feeding, and sheltering habitat. The Program-specific critical habitat units are described in greater detail in the Environmental Baseline section of this document.

California Tiger Salamander

The Service recognizes three distinct population segments of the California tiger salamander: Sonoma County (68 FR 13498), Central California (69 FR 47212), and northern Santa Barbara County (65 FR 57242). The Federal listing history of the California tiger salamander is summarized as follows:

January 19, 2000: The Service emergency lists the California tiger salamander in Santa Barbara County as endangered on (65 FR 3096).

September 21, 2000: The Service lists the Santa Barbara County Distinct Population Segment (DPS) of the California tiger salamander as endangered (65 FR 57242).

May 23, 2003: The Service proposes to list the Central California population of California tiger salamander as threatened and to reclassify the Santa Barbara County and Sonoma County populations from endangered to threatened (68 FR 28648).

August 4, 2004: The Service publishes final rule listing the California tiger salamander as a threatened species rangewide (69 FR 47212). As a result of that action, California tiger salamanders in Santa Barbara County were listed as threatened and no longer considered to represent a distinct population segment.

August 4, 2004: Concurrently with the listing rule the Service promulgated a special rule pursuant to section 4(d) of the Act, exempting from the Act's prohibitions, take of California tiger salamanders resulting from "routine ranching activities."
November 24, 2004: The Service designates critical habitat for the Santa Barbara County DPS (69 FR 68568). The designation includes six units, one for each distinct metapopulation.
August 19, 2005: The U.S. District Court for the Eastern District of California in *Center for Biological Diversity v. U.S. Fish and Wildlife Service*, No. C04-04324 WHA, held that the reclassification of the Santa Barbara County and Sonoma County populations from endangered to threatened was arbitrary and capricious and should be vacated and remanded to the Service.
August 23, 2005: The Service designated critical habitat for the California tiger salamander, Central population, in four regions: Central Valley, Southern San Joaquin Valley, East Bay, and Central Coast (70 FR 49380).
December 14, 2005: The Service designated critical habitat for the Sonoma County distinct population segment of the California tiger salamander (70 FR 74138).

The California tiger salamander is endemic to the grassland community found in California's Central Valley, the surrounding foothills, and coastal valleys (Fisher and Shaffer 1996). The distribution of California tiger salamander breeding locations does not naturally overlap with that of any other species of tiger salamander (Loredo et al. 1996, Petranka 1998, Stebbins 2003).

The California tiger salamander is a large and stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 8.2 inches, with males generally averaging about 8 inches, and females averaging about 6.8 inches. For both sexes, the average snout-to-vent length is approximately 3.6 inches (65 FR 57242). The small eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), larger tails, and larger overall size (Loredo and Van Vuren 1996).

California tiger salamanders spend the majority of their lives in upland habitats and cannot persist without them (Trenham and Shaffer 2005). The upland component of California tiger salamander habitat typically consists of grassland savannah, but includes grasslands with scattered oak trees, and scrub or chaparral habitats (Shaffer et al. 1993, 65 FR 57242). As they cannot dig their own burrows, juvenile and adult California tiger salamanders spend the dry summer and fall months of the year in the active burrows of small mammals, such as California ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gophers (*Thomomys bottae*) (Storer 1925, Loredo and Van Vuren 1996, Trenham 1998, Pittman 2005). Movement of California tiger salamanders within and among burrow systems continues for at least several months after juveniles and adults leave the ponds (Trenham 2001). Some individuals also may use soil crevices as temporary shelter during upland migrations (Loredo et al. 1996).

California tiger salamanders have been found in upland habitats as far as 1.2 miles from breeding habitat. In a trapping study in Contra Costa County, California tiger salamanders were trapped approximately 2,625 feet to 3,940 feet away from potential breeding habitat (69 FR 47212). During a mark and recapture study in the Upper Carmel River Valley, Monterey County, Trenham et al. (2001) observed California tiger salamanders dispersing up to 2,200 feet between breeding ponds between years. In research at Olcott Lake, Solano County, Trenham and Shaffer (2005) captured California tiger salamanders in traps installed 1,312 feet from the breeding pond.

Adults enter breeding ponds during fall and winter rains, typically from October through February (Storer 1925, Loredo and Van Vuren 1996, Trenham et al. 2000). Males migrate to the breeding ponds before females (Shaffer et al. 1993, Loredo and Van Vuren 1996, Trenham 1998). Males usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996, Trenham 1998). In drought years, seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994). Historically, natural ephemeral pools were the primary breeding habitats for California tiger salamanders (Fisher and Shaffer 1996, Petranka 1998). However, with the conversion and loss of many vernal pools to agriculture and urban and suburban development, ephemeral and permanent ponds that have been created for livestock watering are now frequently used by the species (Fisher and Shaffer 1996, Robins and Vollmar 2002).

Females attach their eggs singly or, in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris in the water (Storer 1925). The eggs hatch in 10 to 14 days with newly hatched salamanders (larvae) ranging in size from 0.5 to 0.6 inches in total length (Petranka 1998). The larvae are aquatic and usually metamorphose within 3 to 6 months, prior to drying of seasonal pools (Petranka 1998). Each larva is yellowish gray in color and has a broad fat head, large, feathery external gills, and broad dorsal fins that extend well onto its back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey (Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific treefrogs and California red-legged frogs (Anderson 1968). The larvae are among the top aquatic predators in the seasonal pool ecosystems.

Metamorphosed juveniles leave the breeding sites in the late spring or early summer. Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925, Shaffer et al. 1993) before settling in their selected upland sites for the dry, hot summer months. Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998). Emergence from upland habitat in hot, dry weather occasionally results in mass mortality of juveniles (Holland et al. 1990).

Lifetime reproductive success for California and other tiger salamanders is low. Trenham et al. (2000) found the average female bred 1.4 times over a lifetime, and produced 8.5 young that survived to metamorphosis, per reproductive effort. This resulted in approximately 12

metamorphic offspring over the lifetime of a female. Trenham et al. (2000) also reported that most California tiger salamanders in their study did not reach sexual maturity until 4 or 5 years old, and that less than 5 percent of juveniles survived to reach sexual maturity.

The primary threats to the California tiger salamander are the destruction, degradation, and fragmentation of upland and aquatic habitats through the conversion of these habitats to urban, commercial, and intensive agricultural uses (65 FR 57242, 68 FR 13498, 69 FR 47212). Additional threats to the species include hybridization with introduced non-native barred tiger salamanders (*A. tigrinum mavortium*) (65 FR 57242, 69 FR 47212); destructive rodent and mosquito control techniques (e.g., deep-ripping of burrow areas, use of fumigants/pesticides) (68 FR 13498); reduced survival due to the presence of mosquitofish (*Gambusia* spp.), other nonnative aquatic species, and diseases; and mortality on roads due to vehicle strikes (65 FR 57242).

The primary cause of the past and continuing decline of the California tiger salamander is the loss and degradation of habitat as the result of human activities (Service 2004). Virtually all valley grassland and oak savanna habitat on the Central Valley floor has been lost to urbanization and intensive agriculture, and the vast majority of remaining valley grasslands are generally distributed in a ring around the Central Valley. Consequently, the Central California tiger salamander is also distributed within this ring (Shaffer et al. 1993). This habitat loss has coincided with a more than 20 percent loss of known Central California DPS records as of 2002 (Service 2003b). Habitat loss and fragmentation will continue to occur in the future as California's population continues to increase, resulting in the expansion of urban and agricultural land uses.

Indirect effects of human activities can adversely affect California tiger salamanders and render otherwise suitable habitat functionally lost. Indirect adverse effects include increases in predation after pond modifications that favor exotic species (e.g., bullfrogs (*Rana catesbeiana*), mosquito fish (*Gambusia* spp.)); ecosystem disturbance as a result of ground squirrel eradication efforts; increases in contaminant and pollution run-off; increases in pets, such as dogs and house cats, which may prey on salamanders; increases in native generalist predators (e.g., raccoons (*Procyon lotor*), coyote (*Canis latrans*)) that may be artificially abundant near human activities, and habitat fragmentation from roads and urban areas. Vehicle traffic can cause local population declines and create obstacles to migration and dispersal as mortality occurs from vehicle strikes (Trombulak and Frissell 2000). California tiger salamanders are vulnerable to vehicle strikes due to their slow movements and life history involving migration between breeding and upland habitats (Trombulak and Frissell 2000).

A large-scale introduction of barred tiger salamander occurred approximately 60 years ago, when barred tiger salamander were introduced into the Salinas Valley in support of the bass-bait industry (Riley et al. 2003). These non-native tiger salamanders interbred with Central California tiger salamanders in the wild, and produced viable and fertile offspring. This continues to be a substantial threat to the Central California tiger salamander. Hybrid tiger

salamanders threaten the native species through predation, superior competition for resources, and genetic swamping. Non-native tiger salamander alleles dominate in perennial ponds, suggesting that specific life history traits of non-native tiger salamanders give them an advantage in perennial ponds (Fitzpatrick and Shaffer 2004).

The Service and a diverse collection of partners are engaged in the protection of the Central California tiger salamander and its habitat. Conservation mechanisms include conservation banks, conservation easements, and safe harbor agreements. At least 12 conservation banks, comprising approximately 8,000 acres, have been established to sell credits to offset impacts from projects that destroy or degrade California tiger salamander habitat. In addition, there are multiple public and private lands that protect known occurrences of the California tiger salamander and enhance or restore the species' habitat.

Since listing, approximately 8,656 acres of permanent habitat loss has been exempted through Section 7 of the Act, while more than 25,000 acres of potential habitat have been lost through the Section 10 permitting process.

Recovery plan for the California tiger salamander

The Service has not prepared a recovery plan for the California tiger salamander, and there are no recovery criteria with which to compare the current and future status of the subspecies. In the absence of a recovery plan, we default to the general conservation of the species, and recovery would focus on determining the species' distribution, conservation of much of the remaining habitat that supports the species, reducing threats from non-native species, and creating or restoring additional habitat where possible.

California tiger salamander 5-Year status review

The Service has not completed a 5-year status review of the California tiger salamander.

Critical Habitat for the California Tiger Salamander

On August 23, 2005, the Service published a critical habitat designation for the Central population of California tiger salamander (70 FR 49380). A total of 199,109 acres (as 31 units) were designated as critical habitat in 19 California counties. A detailed discussion of the methods used in designating critical habitat can be found in the final rule.

All of the areas of critical habitat for the California tiger salamander are within the species' historical geographic range and contain PCEs to support at least one of the California tiger salamander's essential life history functions. Based on our current knowledge of the life-history, biology, and ecology of the California tiger salamander, we determined that the PCEs of California tiger salamander critical habitat consist of:

1. Standing bodies of fresh water (including natural and manmade (*e.g.*, stock)) ponds, vernal pools, and other ephemeral or permanent water bodies which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall.
2. Upland habitats adjacent to and accessible from breeding ponds that contain small mammal burrows or other underground habitat that California tiger salamander depend upon for food, shelter, and protection from the elements and predation.
3. Accessible upland dispersal habitat between occupied locations that allow for movement between such sites.

Critical habitat for the California tiger salamander occurs over a large geographic area and is subject to varying degrees of disturbance. Many critical habitat units have been, and continue to be, degraded by agriculture, ranching, urbanization, building of roads and highways, chemical applications, oil production, and competition from introduced species. However, critical habitat for this species can be compatible livestock grazing, and some critical habitat that experiences grazing has been augmented by maintenance of stockponds, which potentially provide PCEs including potential breeding, feeding, and sheltering habitat. The Program-specific critical habitat unit is described in greater detail in the Environmental Baseline section of this document.

Vernal Pool Fairy Shrimp

The Service listed the vernal pool fairy shrimp (*Branchinecta lynchi*) as threatened on September 19, 1994 (59 FR 48136). Critical habitat was designated on August 6, 2003 (68 FR 46684); however, was remanded on November 2, 2006. The court has ordered the Service to reconsider its decision and issue a new critical habitat rule. During this time, the existing critical habitat remains in place. The recovery plan for vernal pool ecosystems of California and southern Oregon (Service 2005a) also addresses this species; however, the populations in coastal San Luis Obispo County were not well known at the time the recovery plan was completed. The following account summarizes information contained in the final rules for listing and designation of critical habitat, the recovery plan, the most recent 5-year review (Service 2007a), and is supplemented by information that has become available since the publication of these documents.

The vernal pool fairy shrimp is a small freshwater crustacean in the family Branchinectidae of the order Anostraca. Adults range in size from 0.4 to 1.0 inches. Habitat for vernal pool fairy shrimp consists of vernal pools and ephemeral wetlands that pond for a period of time sufficient to complete their life cycle. Under optimal conditions this can be as little as 18 days; however, 41 days is more typical of usual seasonal conditions (Helm 1998, Eriksen and Belk 1999). The species often occurs in habitat that exhibits an unpredictable and short-lived inundation pattern and includes vernal pools and vernal pool-like depressions, depressions in sandstone rock outcrops, earth slumps, and grassy swales and depression basins. Upland vegetation communities associated with vernal pool fairy shrimp habitat include native and non-native grassland, alkaline grassland, alkaline scrub, and coastal sage scrub.

Anostracans, including the vernal pool fairy shrimp, are non-selective filter-feeders that filter suspended solids from the water column. Detritus, bacteria, algal cells, and other items between 0.3 to 100 microns may be filtered and ingested. Vernal pool fairy shrimp rarely co-occur with other fairy shrimp species, and when they do, they are not usually the numerically dominant species (Eng et al. 1990, Eriksen and Belk 1999). Vernal pool fairy shrimp have been observed with the versatile fairy shrimp (*Branchinecta lindahli*), Riverside fairy shrimp (*Streptocephalus woottoni*), California fairy shrimp (*Linderiella occidentalis*) and Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*) as well as the federally-listed conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), and vernal pool tadpole shrimp (*Lepidurus packardi*) (Eriksen and Belk 1999, Service 2005a). Fairy shrimp are food for a wide variety of wildlife, including beetles, insect larvae, frogs, salamanders, toad tadpoles, shorebirds, ducks, and even other fairy shrimp.

Freshwater crustaceans, including the vernal pool fairy shrimp, have a two-stage life cycle with the majority of their life cycle spent in a shelled embryo known as a cyst. Vernal pool fairy shrimp females produce an unknown number of cysts per clutch and over their lifetime. The cysts are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks (Eriksen and Belk 1999). Fairy shrimp cysts are capable of withstanding heat, cold, and prolonged desiccation and may persist in the soil for an unknown number of years until conditions are favorable for successful hatching (Eng et al 1999, Eriksen and Belk 1999). The cysts hatch when the vernal pools/seasonal depressions fill with rainwater. Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if the inundation period is too short in a given year. Vernal pool fairy shrimp may also undergo multiple hatches in a single pool during one wet season, if conditions are appropriate (Helm 1998, Gallagher 1996). This species can mature quickly, allowing it to persist in short-lived shallow pools; however, the species also persists later into the spring when pool inundation persists. Cysts and adults disperse between suitable habitats passively by adhesion to waterfowl, migratory birds, cattle, and other wildlife and domestic animals (Eriksen and Belk 1999), as well as through the movement of water between suitable habitats or by cyst adhesion to wind-blown dust.

Although vernal pool fairy shrimp are more widely distributed than most other fairy shrimp species, the species is generally uncommon throughout its range and rarely abundant where it is found (Eng et al 1990, Eriksen and Belk 1999). The species currently occurs predominantly in a variety of vernal pool and ephemerally ponded habitats in the Central Valley and Coast Range of California, with a limited number of sites in the Transverse Range and on the Santa Rosa Plateau and in Hemet, Riverside County. There is also one disjunct occurrence in Jackson County, southern Oregon. California counties where extant records occur include Alameda, Butte, Contra Costa, El Dorado, Fresno, Glenn, Kings, Los Angeles, Madera, Merced, Monterey, Napa, Placer, Riverside, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Solano, Stanislaus, Tehama, Tulare, Ventura, and Yuba (Service 2005a). Elevations at which the species is typically found range from 33 feet to 4,000-ft, although it has been found at 5,600 feet in the Los Padres National Forest (Service 2007a).

Within ephemerally ponded and vernal pool habitat on the Central Coast of California (i.e., Monterey, San Luis Obispo, and Santa Barbara counties), vernal pool fairy shrimp are known to occupy in at least 55 basins on Fort Hunter Liggett, at least 46 basins at Camp Roberts, Soda Lake at the CPNM, several areas in the vicinity of Paso Robles, at least two sites in the Los Padres National Forest, at least two vernal pools at the Santa Maria Airport, and in at least 12 complexes on Vandenberg Air Force Base (Service 2007a). A number of these sites were discovered after the publication of the listing and critical habitat rules and recovery plan.

Maintaining the integrity of surrounding upland habitat is essential to the proper ecological functioning of vernal pool fairy shrimp habitat. Habitat loss and fragmentation is the largest threat to the survival and recovery of vernal pool fairy shrimp and other species restricted to vernal pool and other ephemeral wetland habitats. Approximately 75 percent of historical vernal pool fairy shrimp habitat had been lost in the Central Valley by 1997 (Holland 1998), with additional habitat lost in the Central Coast mountain ranges (Holland 2003). Continuing annual habitat loss is estimated to be between 2 and 12 percent, depending on the region (Holland 2003). Habitat loss is generally a result of urbanization, agricultural conversion, and mining; although loss also occurs in the form of habitat alteration and degradation as a result of changes to natural hydrology, competition from invasive species, incompatible grazing regimes (including overgrazing), energy development, infrastructure projects (e.g., roads, water storage and conveyance, utilities), recreational activities (e.g., off-highway vehicles, hiking), erosion, mosquito abatement activities, climatic and environmental change, and contamination (Service2007c).

Recovery plan for the vernal pool fairy shrimp

The Service completed a recovery plan for the vernal pool fairy shrimp in 2005 (Service 2005a). The goal of the recovery plan is to achieve and protect in perpetuity self-sustaining populations of vernal pool fairy shrimp throughout the species' range and delist the species. The decline of the vernal pool fairy shrimp is attributed primarily to habitat loss and fragmentation resulting from development and agricultural expansion, although invasive species and aquatic contaminants also have contributed to the species' decline. A primary component of the species' recovery is protecting vernal pool habitat in conservation areas and reserves.

The recovery plan specifies that the vernal pool fairy shrimp may be considered for delisting when (complete descriptions are found in the species' recovery plan (Service 2005a)):

1. Occurrences and habitat have been protected;
    a. Eighty percent of known occurrences are protected;
    b. Eighty-five percent of suitable habitat in all core areas is protected; and
    c. The species has been reintroduced to vernal pool regions and soil types from which surveys indicate the species has been extirpated.
2. Appropriate long-term management and monitoring is secured;

3. Status surveys show that populations are stable or increasing and threats have been reduced or eliminated;
4. Research has been conducted on genetic structure, population viability, and additional recovery actions; and
5. Recovery teams and working groups are established to oversee recovery efforts and conduct outreach and incentive programs to develop partnerships.

Vernal pool fairy shrimp 5-Year status review

The Service completed a five-year status review for the vernal pool fairy shrimp in 2007 (Service 2007a). The 5-year review reported that delisting criteria 1 (reintroduction and protection of habitat) and 2 (habitat management and monitoring) have been partially met, including at least 13,000 acres of habitat protected; however, most recovery criteria have not been met. The Service does not have information indicating population or abundance trends for vernal pool fairy shrimp. Surveys for the species have increased the number of known occurrences including occurrences in San Luis Obispo, Santa Barbara, and Ventura Counties; however, concurrent habitat loss and fragmentation has occurred around some known populations. The 5-year review documents extensive habitat loss, including more than 50,000 acres impacted between 1994 and 2005 as a result of human population expansion and conversion of vernal pool habitat to agriculture. The 5-year review also discusses future habitat loss from anticipated development around quickly growing urban areas. The indirect effects of development (e.g., pesticides, altered hydrology) on remaining habitat increasingly compound the effects of habitat loss on the species. The 5-year review acknowledges that the threats to the species have not decreased since listing and recommends that the Service maintain the species' threatened status.

Longhorn Fairy Shrimp

The Service listed the longhorn fairy shrimp as endangered on September 19, 1994 (59 FR 48136). In 2005, the Service designated critical habitat for the longhorn fairy shrimp and several other vernal pool species (70 FR 46924), and the recovery plan for these species was issued later that year (Service 2005a). Although there has been a significant amount of research addressing vernal pool habitats, few studies have addressed longhorn fairy shrimp specifically. The longhorn fairy shrimp is difficult to study because of its rarity. Most of what is known about the species is described in Eng *et al.* (1990), Helm (1998), and Eriksen and Belk (1999).

The longhorn fairy shrimp was first collected in 1937, but was not formally described until 1990 (Eng *et al.* 1990). Although longhorn fairy shrimp generally look similar to other fairy shrimp species, this species is easily identified by the male's very long second antennae, which is about twice as long, relative to its body, as the second antennae of other species of *Branchinecta*. Longhorn fairy shrimp antennae range from 0.3 to 0.4 inch in length (Eriksen and Belk 1999). Female longhorn fairy shrimp may be confused with alkali fairy shrimp (*Branchinecta mackini*), but there are no dorsal outgrowths on the thoracic segments of longhorn fairy shrimp females, while these structures are present in alkali fairy shrimp females (Eng *et al.* 1990). Females can

be recognized by their cylindrical brood pouch, which extends to below abdominal segments six or seven. Mature males range between 0.5 to 0.8 inch in length, and females range from 0.5 to 0.8 inch in length (Eng *et al.* 1990).

The longhorn fairy shrimp is highly adapted to the unpredictable conditions of vernal pool ecosystems. Longhorn fairy shrimp required a minimum of 23 days, but averaged 43 days, to reach maturity in artificial pools described by Helm (1998). However, Helm (1998) found no significant differences between the life span or reproductive rate of the longhorn fairy shrimp and other species of fairy shrimp he studied.

The current distribution of the longhorn fairy shrimp includes portions of San Luis Obispo County, Merced County, Alameda County, Contra Costa County, and Fresno County (Service 2012). The historical distribution of the species is not known, and may never have extended into the northern portion of the Central Valley or into southern California. There is some evidence that temperatures may not be warm enough for the species to mature in the northern portions of the Central Valley, and extensive surveying of vernal pool habitats in southern California has never revealed populations of longhorn fairy shrimp. However, it is likely the species was once more widespread in the regions where it is currently known to occur, and in adjacent areas such as the San Joaquin and Southern Sierra Foothill Vernal Pool Regions, where habitat loss has been extensive (Service 2012).

Although the longhorn fairy shrimp is only known from a small number of locations, these sites contain very different types of vernal pool habitats. Longhorn fairy shrimp in the Livermore Vernal Pool Region in Contra Costa and Alameda Counties live in small, clear, sandstone outcrop vernal pools. These sandstone pools are sometimes no larger than 3.3 feet in diameter (Eng *et al.* 1990), have a pH near neutral, and very low alkalinity and conductivity (Eriksen and Belk 1999). Water temperatures in these vernal pools have been measured between 50 and 64 degrees Fahrenheit. In both the San Joaquin and Carrizo Vernal Pool Regions, the longhorn fairy shrimp is found in clear to turbid, grassland pools (Helm 1998, Eriksen and Belk 1999). These grassland pools may be as large as 203.4 feet in diameter (Eng *et al.* 1990) with water temperatures between 50 to 82 degrees Fahrenheit. Longhorn fairy shrimp have been found at elevations ranging from 75.5 feet in the San Joaquin Vernal Pool Region to 2,887 feet in the Carrizo Vernal Pool Region.

The longhorn fairy shrimp has been found in the same general area as the Conservancy fairy shrimp, vernal pool fairy shrimp, California fairy shrimp, versatile fairy shrimp (*Branchinecta lindahli*) and spadefoot toad *(Spea hammondii*) tadpoles at different locations (Eng *et al.* 1990, Eriksen and Belk 1999). Active adult longhorn fairy shrimp have been observed from the same vernal pool as versatile fairy shrimp and spadefoot toad tadpoles on the Carrizo Plain.

Maintaining the integrity of surrounding upland habitat is essential to the proper ecological functioning of longhorn fairy shrimp habitat. Habitat loss and fragmentation is the largest threat to the survival and recovery of longhorn fairy shrimp and other species restricted to vernal pools

and other ephemeral wetland habitats. Habitat loss is generally a result of urbanization, agricultural conversion, renewable energy, and mining, although loss also occurs in the form of habitat alteration and degradation as a result of changes to natural hydrology, competition from invasive species, incompatible grazing regimes (including overgrazing), energy development, infrastructure projects (e.g., roads, water storage and conveyance, utilities), recreational activities (e.g., off-highway vehicles, hiking), erosion, mosquito abatement activities, climatic and environmental change, and contamination (Service 2005c).

Recovery plan for the longhorn fairy shrimp

The Service completed a recovery plan for the longhorn fairy shrimp in 2005 (Service 2005a). The goal of the recovery plan is to achieve and protect in perpetuity self-sustaining populations of longhorn fairy shrimp throughout the species' range and delist the species. The decline of the longhorn fairy shrimp is attributed primarily to habitat loss and fragmentation resulting from development and agricultural expansion, although invasive species and aquatic contaminants also have contributed to the species' decline. A primary component of the species' recovery is protecting vernal pool habitat in conservation areas and reserves.

The recovery plan specifies that the longhorn fairy shrimp may be considered for downlisting when:

1. All known occurrences are protected; and
2. Ninety-five percent of suitable habitat in all core areas is protected.

Longhorn fairy shrimp may be considered for delisting when downlisting criteria have been met, and

1. All newly discovered or reintroduced occurrences are protected. This includes reintroduction of the species to vernal pool regions and soil types from which surveys indicate the species has been extirpated;
2. Appropriate long-term management and monitoring is secured;
3. Status surveys show that populations are stable or increasing and threats have been reduced or eliminated;
4. Research has been conducted on genetic structure, population viability, and additional recovery actions; and
5. Recovery teams and working groups are established to oversee recovery efforts and conduct outreach and incentive programs to develop partnerships.

Complete descriptions of the downlisting and delisting criteria are found in the species' recovery plan (Service 2005a).

Longhorn fairy shrimp 5-Year status review

The Service completed a five-year status review for the longhorn fairy shrimp in 2012 (Service 2012). The 5-year review reported that delisting criteria 1 (reintroduction and protection of habitat) and 2 (habitat management and monitoring) have been partially met; however, other recovery criteria have not been met. The majority of known longhorn fairy shrimp populations is on public land and protected from development. Other populations are on private land and are threatened by energy development and other disturbance. Recent surveys discovered new localities of longhorn fairy shrimp, but these were within existing populations and did not expand the known geographic range of the species. The 5-year review emphasizes that the longhorn fairy shrimp is extremely rare; that each known population is essential for the species' recovery; and that all populations are threatened by climatic variation, invasive plant species, inappropriate grazing regimes, and stochastic events. Accordingly, the 5-year review recommends that the Service maintain the species' endangered status.

Critical Habitat for the Vernal Pool Fairy Shrimp and Longhorn Fairy Shrimp

The Service designated critical habitat for the vernal pool and longhorn fairy shrimp on August 6, 2003 (68 FR 46684) and clarified the designation on February 10, 2006 (71 FR 7118). The designation for vernal pool fairy shrimp contains 597,821 acres in 84 subunits, and the designation for longhorn fairy shrimp contains 13,557 acres in 4 subunits. A detailed discussion of the methods used in designating critical habitat can be found in the final rule.

All of the critical habitat units designated for fairy shrimp are within the species' historical geographic range and contain PCEs to support at least one of the species' essential life history functions. Based on our current knowledge of the life history, biology, and ecology of both fairy shrimp species, we determined that the PCEs of critical habitat for these species include:

1. Topographic features characterized by mounds and swales, and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools described in PCE 2, providing for dispersal and promoting hydroperiods of adequate length in the pools;
2. Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 23 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction;
3. Sources of food, expected to be detritus naturally occurring within the pools or contributed by overland flow from the surrounding area, such as single-celled bacteria, algae, and dead organic matter;
4. Structure that provides shelter within the pools described in PCE 2, consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris.

Critical habitat for the vernal pool and longhorn fairy shrimp occurs over a large geographic area and is subject to varying degrees of disturbance. The critical habitat in LPNF is protected from most disturbance, while many of the units elsewhere have been, and continue to be, degraded by increasing development, nonnative plant species, alteration of natural hydrology, habitat fragmentation, and recreational use. The Program-specific critical habitat units are described in greater detail in the Environmental Baseline section of this document.

San Joaquin Kit Fox

The Service listed the San Joaquin kit fox as an endangered species on March 11, 1967 (32 FR 4001), and the species was listed by the State of California as threatened on June 27, 1971. The Service issued the Recovery Plan for Upland Species of the San Joaquin Valley in 1998 (Service 1998c) and completed a 5-year status review on February 16, 2010 (Service 2010b).

The San Joaquin kit fox is a small canid, with an average body length of 20 inches and weighing about 5 pounds. Pelage color ranges from tan to buffy gray in the summer to silvery gray in the winter, with a white underside and black-tipped tail. Kit foxes are active year round, and are primarily nocturnal. The grizzled coloration and black-tipped tail aid in distinguishing the San Joaquin kit fox from the larger (9 to 11 pound) red fox (*Vulpes vulpes*). Gray foxes (*Urocyon cinereoargenteus*) are similar in coloration to the San Joaquin kit fox, but are heavier (8 pounds) and have a dark stripe running along the top of their tail (Grinnell et al. 1937).

In the southernmost portion of the range, San Joaquin kit foxes utilize valley sink scrub, valley saltbush scrub, upper Sonoran subshrub scrub, and annual grassland communities. San Joaquin kit foxes also exhibit a capacity to utilize habitats that have been altered by humans, such as oil fields, grazed pasturelands, agricultural land, and wind farms (Cypher 2000). Homeranges of 1 to 12 square miles (640 to 7,680 acres) have been reported, with larger homerange sizes where prey is scarce; homeranges can overlap considerably (White and Ralls 1993, Service 1998). San Joaquin kit foxes may live to 10 years in captivity (McGrew 1979) and 8 years in the wild (Berry et al. 1987), but most kit foxes do not live past 2 to 3 years of age.

Adult San Joaquin kit foxes are usually solitary during late summer and fall. In September and October, adult females begin to excavate and enlarge natal dens (Morrell 1972), and adult males join the females around October or November (Morrell 1972). Typically, pups are born between February and late March, following a gestation period of 49 to 55 days (Egoscue 1962; Morrell 1972; Spiegel and Tom 1996; Service1998c). Mean litter size ranges from 2 to 4 pups (White and Ralls 1993, Spencer et al. 1992, Spiegel and Tom 1996, Cypher et al. 2000). Pups appear above ground at about 3 to 4 weeks of age, and are weaned at 6 to 8 weeks of age.

Dens are used by kit foxes for temperature regulation, shelter from adverse environmental conditions, and escape from predators. Kit foxes typically use individual dens for only brief periods, often for only one day before moving to another den (Ralls et al. 1990). San Joaquin kit fox dens are rather deep and complex and although kit fox dens are often found on loose, friable

soil, they have been found on a variety of soil types (Service1998c). Some studies have suggested that where hardpan layers predominate, kit foxes create their dens by enlarging the burrows of California ground squirrels (*Spermophilus beecheyi*) or badgers (*Taxidea taxus*) (Jensen 1972; Morrell 1972; Orloff et al. 1986). Common locations for dens include washes, drainages, and roadside berms occurring on less than a 22 percent slope. Kit foxes also den in human-made structures such as culverts and pipes (Spiegel 1996).

Natal and pupping dens may include anywhere from 2 to 18 entrances and are usually larger than dens that are not used for reproduction (O'Farrell et al. 1980; O'Farrell and McCue 1981). Natal dens may be reused in subsequent years (Egoscue 1962). Natal and pupping dens usually can be identified by the presence of scat, prey remains, matted vegetation, and mounds of excavated soil (i.e., ramps) outside the dens; however, one study showed that more than half of the dens that were occupied showed no typical signs of occupation (Orloff et al. 1986).

Although most young San Joaquin kit foxes disperse less than 5 miles from their natal den (Scrivner et al. 1987), dispersal distances of up to 76.3 miles have been documented (Scrivner et al. 1993; Service 1998c). Dispersal can be through disturbed habitats, including agricultural fields, and across highways and aqueducts. San Joaquin kit foxes generally disperse from their natal dens at around 4 to 32 months of age (Cypher 2000).

The diet of the San Joaquin kit fox varies geographically, seasonally, and annually, based on temporal and spatial variation in abundance of potential prey. In the portion of their geographic range that includes Merced County, known prey species of the kit fox include white-footed mice, insects, California ground squirrels, kangaroo rats, San Joaquin antelope squirrels, black-tailed hares (*Lepus californicus*), chukar (*Alectoris chukar*), desert cottontails (*Sylvilagus audubonii),* ground-nesting birds, and pocket mice (*Perognathus* spp.) (Jensen 1972, Archon 1992).

Currently, the entire range of the kit fox appears to be similar to what it was at the time of the 1998 Recovery Plan; however, population structure has become more fragmented, at least some of the resident satellite subpopulations, such as those at Camp Roberts, Fort Hunter Liggett, Pixley National Wildlife Refuge (NWR), and the San Luis NWR, have apparently been locally extirpated (White *et al*. 2000; Moonjian 2007; M. Moore, Camp Roberts, *in litt*. 2008), and portions of the range now appear to be frequented by dispersers rather than resident animals (Moore *in litt*. 2008). For example, at Fort Hunter Liggett, although approximately 36,000 acres is considered to be potential kit fox habitat, the greatest number of kit fox observed in one year was 22 (in 1990), and no kit fox have been observed since 2000 (Service 2010b). Kit fox abundance appears to be below detection levels in much of San Luis Obispo County outside of the Carrizo Plains (Moonjian 2007).

The distribution and abundance of the kit fox has decreased since its listing in 1967. Less than 20 percent of the habitat within the historical range of the kit fox remained when the subspecies was listed in 1967, and there has been a substantial net loss of habitat since that time. Prior to 1930, the range of the San Joaquin kit fox extended from southern Kern County north to Tracy,

San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side (Grinnell et al. 1937; Service1998c). Extensive land conversions in the Central Valley began as early as the mid-1800s with the Arkansas Reclamation Act. The primary factor contributing to this restricted distribution was the conversion of native habitat to irrigated cropland, industrial uses (e.g., oil and gas development), and urbanization (Laughrin 1970, Jensen 1972; Morrell 1972, 1975). By 1979, only approximately 370,000 acres out of a total of approximately 8.5 million acres on the San Joaquin Valley floor remained as non-developed land (Williams 1985). Most recently, solar energy development has emerged as a threat to remaining San Joaquin kit fox habitat.

Land conversions contribute to declines in kit fox abundance through direct and indirect mortalities, displacement, loss of habitat connectivity, reduction of prey populations and denning sites, changes in the distribution and abundance of larger canids that kill kit foxes or compete with kit foxes for resources, and reductions in carrying capacity. Extensive habitat destruction and fragmentation have contributed to smaller, more-isolated populations of kit foxes.

Predators (such as coyotes, bobcats, non-native red foxes, badgers, and golden eagles (*Aquila chrysaetos*)) will kill kit foxes. Badgers, coyotes, and red foxes also may compete for den sites (Service1998c). Disease outbreaks could potentially cause substantial mortality or contribute to reduced fertility in seropositive females, as was noted in closely-related swift foxes (*Vulpes velox*). Pesticides and rodenticides pose a threat to kit foxes through direct or secondary poisoning. Kit foxes could be affected through direct contact with sprays and treated soils, or through consumption of contaminated prey (Service 2010b).

Recovery plan for the San Joaquin kit fox

The Service completed a recovery plan for the San Joaquin kit fox in 1998 (Service 1998c). The goals of the recovery plan are to initially downlist and ultimately delist the species. The decline of the San Joaquin kit fox is primarily caused by past and ongoing habitat loss, fragmentation, and degradation resulting from urban, agricultural, and other development. Shooting, trapping, poisoning, road kills, and competition with non-native species also have contributed to the species decline. The recovery plan identifies six key processes for recovery of the San Joaquin kit fox: (1) achieving general recovery objectives, which include protecting occurrences and habitat of the species from development and other incompatible uses, developing and implementing habitat management plans, and achieving self-sustaining populations of kit foxes; (2) establishing a network of habitat conservation areas and reserves, (3) focusing conservation efforts on umbrella species (e.g., San Joaquin kit fox) and keystone species (e.g., giant kangaroo rat); (4) developing and implementing a monitoring and research program; (5) implementing adaptive management informed by research and monitoring; and (6) minimizing the economic and social cost of recovery actions.

The recovery plan specifies that the San Joaquin kit fox may be considered for downlisting when:

1. The three core kit fox populations (Carrizo Natural Area, western Kern County, and Ciervo-Panoche Area) are secured and protected;
2. A management plan for each core area has been approved and is being implemented; and
3. Population monitoring indicates that the three core kit fox populations are stable or increasing, and population interchange is occurring between one or more core populations and satellite populations.

The San Joaquin kit fox may be considered for delisting when downlisting criteria have been met, and

1. Several satellite kit fox populations are secured and protected;
2. Management plans for all protected areas have been approved and are being implemented; and
3. Population monitoring indicates that the kit fox populations in three or more satellite areas are stable or increasing;

Complete descriptions of the downlisting and delisting criteria are found in the species' recovery plan (Service 1998c).

San Joaquin kit fox 5-Year status review

The Service completed a five-year status review for the San Joaquin kit fox in February 2010 (Service 2010b). The 5-year review reported that the geographic range of the kit fox has changed little since the 1998 Recovery Plan was completed; however, the species' distribution is increasingly fragmented, abundance is low or fluctuates dramatically in known populations, some satellite subpopulations (e.g., Camp Roberts, Fort Hunter Liggett) appear to be extirpated, and portions of the range now appear to be frequented by dispersers rather than resident animals. The largest remaining kit fox population is in the Carrizo Plain, but the species' abundance appears to be below detection levels in much of the rest San Luis Obispo County. The 5-year review states that the largest threat to the kit fox remains the loss of habitat due to agricultural conversion, infrastructure construction, and urban development; while secondary threats include mineral extraction, wildfire frequency, non-native species, and incompatible grazing practices. Solar energy development is a new and potentially substantial threat that can eliminate suitable habitat or present obstacles to dispersal.

The primary conservation and recovery strategy for the San Joaquin kit fox is preservation of existing natural kit fox habitat, and over 150,000 acres were conserved between 1987 and 2007 through the section 7 and section 10 processes under the Act. In addition, several hundred thousand acres under Federal, State, or private ownership are, at least in part, managed to benefit the San Joaquin kit fox; although the kit fox appears to be absent from some of these areas. The 5-year review recommended that the Service maintain the species' endangered status, because

the primary threats to the species are ongoing, the species has exhibited a continued decline, and the downlisting criteria have not been met.

Giant Kangaroo Rat

The giant kangaroo rat was federally listed as endangered on January 5, 1987 (52 FR 283), and was listed by the State of California as endangered on October 2, 1980. The Recovery Plan for Upland Species of the San Joaquin Valley includes the giant kangaroo rat (Service 1998c). The Service completed a 5-year status review for the giant kangaroo rat on February 16, 2010 (Service 2010c).

The giant kangaroo rat is a small burrowing rodent with large hind limbs adapted for bipedal locomotion, a long tail, and large fur-lined cheek pouches (Grinnell 1922; Eisenberg 1963). Giant kangaroo rats are primarily seed eaters, but also eat plants and insects. They inhabit gently sloped annual grassland communities with few or no shrubs located on well drained, sandy-loam soils in areas that receive less than 10 inches of annual precipitation (Grinnell 1932; Shaw 1934; Hawbecker 1951). Giant kangaroo rats form colonies of burrows called precincts (Braun 1985) in which multiple individuals reside (Randall 1997).

The giant kangaroo rat is a keystone species—a species which has a disproportionately large impact on its ecosystem relative to its abundance—in grasslands and shrub communities (Schiffman 1994; Goldingay *et al.* 1997). Keystone species occupy a critical role in maintaining a proper functioning ecosystem, because they facilitate healthy populations of other species in that ecosystem. For example, in a natural San Joaquin Valley upland ecosystem the giant kangaroo rat is a primary food source for the San Joaquin kit fox, the species' burrows provide shelter for the blunt-nosed leopard lizard and San Joaquin antelope squirrels (*Ammospermophilus nelsoni*) (Williams 1992), and in some areas the species' precincts are nearly the only habitat on which the California jewelflower will grow (Cypher 1994).

As summarized in the final listing rule (52 FR 283), the Recovery Plan (Service1998c), and the 5 year review (Service 2010c) for the species, giant kangaroo rats are primarily nocturnal and are active all year in all types of weather. Individuals of the species rarely appear above-ground during the day hours, and at night only appear for about 15 minutes during a 2-hour period. The only other times it appears above-ground are at the end of the growing season of herbaceous plants to gather seeds from the fully-grown plants. One of the species' most common food plants is peppergrass (*Lepidium* spp.). The giant kangaroo rat caches and stores seeds in a "larder" for later eating. Giant kangaroo rats' hearing is highly developed and a large portion of the brain is devoted to auditory input (Service 2004). Kangaroo rats are known to communicate with each other by foot drumming (Randall and Lewis 1997).

The giant kangaroo rat usually breeds between December and May, although reproduction can extend into Fall depending on environmental variables and population structure (Williams et al 1993). Williams et al (1993) observed extended breeding seasons when population density was

low and sufficient food was available. Females give birth to a litter of one to seven young, with an average of three per litter. Individuals communicate with potential mates by performing "sandbathing," where the giant kangaroo rat rubs its sides in sand, leaving behind a scent to attract mates. Individuals of the species live from 2 to 4 years.

The original distribution of the giant kangaroo rat is known to have extended from southern Merced County, through the San Joaquin Valley, to southwestern Kern County and northern Santa Barbara County (Hall 1981). The giant kangaroo rat has been completely extirpated in Merced County, and only a few small, isolated colonies survived in San Benito, Fresno, and Kings Counties. Genetic researchers group the giant kangaroo rat into two major populations: western Kern and eastern San Luis Obispo Counties (southern range), and western Fresno and eastern San Benito Counties (northern range) (Loew *et al.* 2005). These researchers also identify three satellite populations near the southern range: Cuyama Valley, San Juan Creek Valley, and Kettleman Hills.

Remaining natural lands with suitable habitat for giant kangaroo rat continue to decline. Before the 1950s, colonies of giant kangaroo rats were spread over hundreds of thousands of acres of continuous habitat in the western San Joaquin Valley, Carrizo Plain, and Cuyama Valley (Grinnell 1932; Shaw 1934; Hawbecker 1944, 1951). The listing rule estimated historical range of the giant kangaroo rat to be from 1,300,000 to 2,500,000 acres. After the completion of surveys throughout the potential geographic area between 1979 and 1987, Williams (1992) reported the distribution of giant kangaroo rats was restricted to approximately 27,450 acres (1 to 2 percent of the historical range). The reduction in giant kangaroo rat distribution was due to widespread agricultural development of natural habitat in the San Joaquin Valley beginning in the 1960s. The remaining habitats are highly fragmented and mostly located on suboptimal terrain (Grinnell 1932; Williams 1992; Williams *et al.* 1993, 1995; Goldingay *et al.* 1997). There have been no subsequent range-wide surveys of giant kangaroo rats since the late 1980s.

Currently, the major threats to the giant kangaroo rat include the development of large scale renewable solar energy projects and construction of large transmission lines, both of which are new threats since publication of the listing rule; potential increases in oil and gas development in the southern range and Kettleman Hills; increased off-road vehicle use throughout the species' range but particularly in the southern range; urban and residential development in western Kern County; disease; rodenticides; overgrazing; and stochastic events (Service 2010c).

Recovery plan for the giant kangaroo rat

The Service completed a recovery plan for the giant kangaroo rat in 1998 (Service 1998c). The goals of the recovery plan are to initially downlist and ultimately delist the species. The decline of the giant kangaroo rat is primarily caused by past and ongoing habitat loss, fragmentation, and degradation resulting from agricultural and other development. Rodenticide poisoning likely also contributed to the species decline. The recovery plan identifies six key processes for recovery of the giant kangaroo rat: (1) achieving general recovery objectives, which include

protecting occurrences and habitat of the species from development and other incompatible uses, developing and implementing habitat management plans, and achieving self-sustaining populations of giant kangaroo rats; (2) establishing a network of habitat conservation areas and reserves, (3) focusing conservation efforts on umbrella species (e.g., San Joaquin kit fox) and keystone species (e.g., giant kangaroo rat); (4) developing and implementing a monitoring and research program; (5) implementing adaptive management informed by research and monitoring; and (6) minimizing the economic and social cost of recovery actions.

The recovery plan specifies that the giant kangaroo rat may be considered for downlisting when:

1. All occupied lands in the Carrizo Natural Area, Ciervo-Panoche Natural Area, and western Kern County are secured and protected;
2. A management plan for each protected area has been approved and is being implemented; and
3. Population monitoring shows a population change of no greater than 20 percent over a 5-year period without drought and 35 percent above average precipitation.

The giant kangaroo rat may be considered for delisting when downlisting criteria have been met, and

1. All occupied habitat on public land in the Cuyama Valley, San Juan Creek Valley, and Kettleman Hills is secured and protected;
2. Management plans have been approved and are being implemented for the Cuyama Valley and Kettleman Hills; and
3. Population monitoring indicates stable giant kangaroo rat metapopulations in the Carrizo Natural Area, Ciervo-Panoche Natural Area, and western Kern County through one precipitation cycle.

Complete descriptions of the downlisting and delisting criteria are found in the species' recovery plan (Service 1998c).

Giant kangaroo rat 5-Year status review

The Service completed a five-year status review for the giant kangaroo rat in February 2010 (Service 2010c). The 5-year review reiterates that less than five percent of the species' historical habitat remains rangewide, and that much of this is sub-optimal. No rangewide assessment of the giant kangaroo rat has been completed since the 1980's; however, portions of the species' range have been surveyed recently. Giant kangaroo rat populations in the Carrizo Plain, the Lokern area, and the Elk Hills occur primarily on protected land and are considered stable to increasing. Populations in other areas are surveyed irregularly using a variety of survey methods, and there is not enough data to indicate long-term trends in these populations. In general, these populations are considered extant but exhibit large interannual fluctuations. Potentially suitable habitat that has not been surveyed for the species continues to be destroyed

or disturbed. The 5-year review states that habitat loss remains the greatest threat to the giant kangaroo rat; although, solar energy development, mineral extraction, urban/residential development, and off-road vehicle use are now the primary reasons for habitat loss. Additional ongoing threats include rodenticide use, marginality of remaining habitat, incompatible grazing regimes, lack of management to control vegetation density (e.g., grazing or fire), and stochastic events.

The primary conservation and recovery strategy for the giant kangaroo rat is preservation of existing natural habitat for the species. Over 92,000 acres of occupied habitat have been conserved, and efforts are underway to conserve an additional 51,000 acres. However, the 5-year review recommended that the Service maintain the species' endangered status; because substantial threats to the species are ongoing; remaining habitat is fragmented and most of it is unprotected; and the small, isolated populations are threatened by stochastic events and low genetic diversity.

Blunt-nosed Leopard Lizard

The Service listed the blunt-nosed leopard lizard as federally endangered on March 11, 1967 (32 FR 4001), and the State of California designated the species as endangered on June 27, 1971. The Service first prepared a recovery plan for the species in 1980 and revised the plan in 1985. The multi-species Recovery Plan for Upland Species of the San Joaquin Valley (Service 1998c), issued by the Service in 1998, replaced the 1985 plan. This species account is a brief summary of the recovery plan, except as otherwise cited.

The blunt-nosed leopard lizard is a relatively large Iguanid lizard with a long, regenerative tail; long, powerful hind limbs; and a short, blunt snout (Smith 1946; Stebbins 2003). The ventral surface is generally white, but the species exhibits tremendous variation in color and pattern on the dorsal side (Tanner and Banta 1963; Montanucci 1970), ranging from yellowish or light gray-brown to dark brown. The dorsal color pattern consists of longitudinal rows of dark spots interrupted by a series of 7 to 10 white, cream-colored, or yellow transverse bands. Males are typically larger and weigh more than females; adults range in size from 3.4 to 4.7 inches from snout to vent (Tollestrup 1982).

Blunt-nosed leopard lizards occur in areas of low relief with open, sparse vegetation of 15 to 30 percent ground cover. They are associated with vegetation communities such as valley sink scrub, valley saltbush scrub, alkali playa, valley/plain grasslands, and foothill grasslands. Associated vegetation includes shrubs of the family Chenopodiaceae, such as iodine bush (*Allenrolfea occidentalis*) and saltbush (*Atriplex* spp.), bunchgrasses, non-native annual grasses, and Mormon tea (*Ephedra* spp.)(Stebbins 2003). They are generally absent from steep slopes, areas of dense vegetation with greater than 50 percent cover, and areas subject to seasonal flooding.

Blunt-nosed leopard lizards seek shelter from predators and temperature extremes primarily in abandoned ground squirrel tunnels and unoccupied or occupied kangaroo rat burrows, but also use rock piles, trash piles, and brush. In areas of low burrow density, they may construct shallow, simple tunnels in earth berms or under rocks. Adults are active above ground from March or April through August or September, although they are less active in the hotter months of summer. Diurnal activity is temperature-dependent (optimal temperature range is 74 to 104 degrees Fahrenheit), and on hotter days they are most likely to be observed in the morning and late afternoon. Adults hibernate beginning in August or September, while hatchlings are active until mid-October or November. They can withstand severe, long-term drought by remaining dormant for up to 22 months. Males are highly territorial and may have home ranges of up to 21 acres, although densities can range from 0.1 to 4.2 per acre. Warrick et al. (1998) found that average male home range size was 10.48 acres, and the average female home range size was 4.99 acres.

The blunt-nosed leopard lizard was historically distributed throughout the San Joaquin Valley and adjacent interior foothills and plains, extending from central Stanislaus County south to northeastern Santa Barbara County and northwestern Ventura County. However, blunt-nosed leopard lizard habitat has been significantly reduced, degraded, and fragmented by agricultural development, petroleum and mineral extraction, sand and gravel mining, livestock grazing, pesticide application, and off-road vehicle use. This includes more than 94 percent of wildlands on the San Joaquin Valley floor. These habitat losses have, and continue to, cause increasing fragmentation of remaining habitat and increasing distances between extant populations. The physical effects of these stressors include direct and indirect mortality, intraspecific aggression, barriers to movement, reduction of prey populations, decrease in individual and reproductive fitness, loss of metapopulation dynamics, and loss of genetic diversity.

The currently known occupied range of the blunt-nosed leopard lizard includes Merced and Madera counties in the north, through Fresno, Kings, Tulare, and Kern Counties to San Luis Obispo, Santa Barbara, and Ventura Counties in the south (Service 1998c); however, the species' remaining habitat is limited to scattered parcels of undeveloped land and margins of developed land with the greatest concentrations occurring on the west side of the San Joaquin Valley floor and in the foothills of the Transverse Ranges, up to elevations of approximately 3,000 feet (CDFG 2004). Extant populations are known from the Carrizo Plain, Elk Hills, around Taft, the Cuyama Valley, and at various other locations.

Until recently, the blunt-nosed leopard lizard was believed to hybridize with the long-nosed leopard lizard (*Gambelia wislizenii*) where their ranges meet in Ballinger Canyon and the upper Cuyama River watershed (Santa Barbara and Ventura Counties). This was based on morphological description and delineation by Montanucci in the 1970's (Montanucci 1970, 1978). Grimes et al. (2010) completed a genetic analysis (DNA barcoding) of *Gambelia* lizards in the same regions of the upper Cuyama River watershed studied by Montanucci. Grimes et al. (2010) sampled 34 lizards, including 14 from the "hybrid zone," that morphologically appeared to be *G. sila*, *G. wislizenii*, or hybrids. Their results did not demonstrate hybridization and

identified all lizards in their study as species *sila*. They concluded "that true *G. wislizenii* and true *G. sila* are allopatric and are not actively producing hybrids in the canyons and Cuyama Valley (Grimes et al. 2010, p.10)."

Recovery plan for the blunt-nosed leopard lizard

The Service completed a recovery plan for the blunt-nosed leopard lizard in 1998 (Service 1998c). The goals of the recovery plan are to initially downlist and ultimately delist the species. The recovery strategy states that the most important factors in recovering the blunt-nosed leopard lizard are (1) determining appropriate habitat management and compatible land uses for the species; (2) protecting additional habitat in key portions of the species' range; and (3) gathering additional data on population responses to environmental variation at representative sites in the existing geographic range. The recovery plan also includes a list of recovery actions that implement the recovery strategy (Service 1998c).

The recovery plan specifies that the blunt-nosed leopard lizard may be considered for downlisting when:

1. Five or more areas, each approximately 5,997 acres, of contiguous, occupied habitat are secured and protected;
2. A management plan for each protected area has been approved and is being implemented; and
3. Each protected area has a mean density of one or more lizard(s) per acre through one precipitation cycle.

The blunt-nosed leopard lizard may be considered for delisting when downlisting criteria have been met, and

1. Three additional areas, each approximately 5,997 acres, of contiguous, occupied habitat are secured and protected;
2. Management plans have been approved and are being implemented for all protected areas; and
3. Each protected area has a mean density of one or more lizard(s) per acre through one precipitation cycle.

Complete descriptions of the downlisting and delisting criteria are found in the species' recovery plan (Service 1998c).

Blunt-nosed leopard lizard 5-Year status review

The Service completed a 5-year status review for the blunt-nosed leopard lizard in February 2010 (Service 2010d). The 5-year review states that less than 15 percent of the species' historical habitat remains rangewide, and less than 5 percent remains in the San Joaquin Valley. No

rangewide assessment of the blunt-nosed leopard lizard has been completed. Portions of the species' range are surveyed regularly, and while some populations are healthy/stable, many areas have very low densities of blunt-nosed leopard lizards. Potentially suitable habitat that has not been surveyed for the species continues to be destroyed or disturbed. The 5-year review states that habitat loss and modification by agriculture expansion and urban development remains the greatest threat to the blunt-nosed leopard lizard; although, solar energy development is an emerging threat that could affect a substantial amount of the species' habitat.

The primary conservation and recovery strategy for the blunt-nosed leopard lizard is preservation of existing natural habitat for the species. Over 91,000 acres of occupied habitat have been conserved, and efforts are underway to conserve an additional 50,000 acres. However, much of the protected habitat is arranged in scattered parcels that do not meet the downlisting criterion requiring habitat protection. In addition, not all protected areas have functional management plans, and densities of blunt-nosed leopard lizards are not above one per acre in all protected areas (downlisting criteria 2 and 3, respectively). Therefore, the 5-year review recommended that the Service maintain the species' endangered status; because substantial threats to the species are ongoing; too little habitat is protected; and the remaining populations do not exhibit sufficient densities or stability.

Least Bell's Vireo

The Service listed the least Bell's vireo as endangered on May 2, 1986 (51 FR 16474), and designated critical habitat for the subspecies on February 2, 1994 (59 FR 4845). A draft recovery plan was completed in 1998 (Service 1998a); no final plan has been published. The Service completed a five-year status review (Service 2006b) for the least Bell's vireo in September 2006 in which we noted a 10-fold increase in population size since its listing in 1986, expansion of locations with breeding least Bell's vireo throughout southern California, and conservation and management of suitable breeding habitat throughout its range (Service 2006b). The least Bell's vireo is in the family Vireonidae and is one of four subspecies of Bell's vireo (*Vireo bellii*) recognized by the American Ornithological Union (AOU 1957), with each subspecies isolated from one another throughout the year (Hamilton 1962; Service 1998a). Additional information on the least Bell's vireo may be found in Wilbur (1980), Garrett and Dunn (1981), Miner (1989), and Service (1998, 2006b).

The least Bell's vireo is a small, migratory songbird that nests almost exclusively in riparian woodland habitats; however they may also use adjoining upland scrub habitat (Salata 1983). The subspecies typically inhabits structurally diverse woodlands along watercourses that feature dense cover within 3 to 6 feet of the ground and a dense, stratified canopy (Goldwasser 1981; Salata 1983; Gray and Greaves 1984; Service 1998a). The understory within this riparian habitat is usually dominated by mulefat, California wild rose (*Rosa californica*), poison oak (*Toxicodendron diversiloba*), sandbar willow (*Salix hindsiana*), young individuals of other willow species, and several perennial species (Service 1998a). Important canopy species include

mature arroyo willows and black willows (*S. gooddingii*), and occasional cottonwoods, western sycamore, or coast live oak.

Least Bell's vireos primarily feed on invertebrates, especially lepidopteran (moth and butterfly) larvae, within willow stands or associated riparian vegetation (Miner 1989). Least Bell's vireos occasionally forage in non-riparian vegetation such as coastal sage scrub, chaparral, and oak woodlands, although foraging in these other habitats usually occurs within 100 feet of the edge of riparian vegetation (Salata 1983; Gray and Greaves 1984). Least Bell's vireo feeding behavior largely consists of gleaning prey from leaves or woody surfaces while perched or hovering, and less frequently by capturing prey by aerial pursuit (Salata 1983; Miner 1989). Least Bell's vireos concentrate most of their foraging between 0 to 20 feet above ground level (Salata 1983; Miner 1989).

Least Bell's vireos generally arrive in southern California breeding areas by mid-March to early April, with males arriving before females and older birds arriving before first-year breeders (Service 1998a). They are site-tenacious across breeding seasons and highly territorial. Least Bell's vireos generally remain on the breeding grounds until mid to late September, although some post-breeding migration may begin as early as late July (Service 1998a). Male least Bell's vireos establish and defend breeding territories through singing and physically chasing intruders (Beck 1996; Service 1998a). Although territories typically range in size from 0.5 to 7.5 acres (Service 1998a), no relationship appears to exist between territory size and various measures of territory quality (Newman 1992).

Nest building commences a few days after pair formation, with the female selecting a nest-site location and both sexes constructing the nest (Barlow 1962; Service 1998a). Nests are typically suspended in forked branches within 3 feet of the ground with no clear preference for any particular plant species as the nest host (Barlow 1962; Gray and Greaves 1984; Service 1998a). Typically 3 or 4 eggs are laid on successive days shortly after nest construction (Service 1998a). The eggs are incubated by both parents for about 14 days with the young remaining in the nest for another 10 to 12 days (Nolan 1960; Barlow 1962). Least Bell's vireos may attempt up to five nests within a breeding season, but they are typically limited to one or two successful nests within a given breeding season (Service 1998a). Fledgling least Bell's vireos gradually increase the distance they travel from the nest from about 35 feet the first day, about 200 feet several weeks after fledging (Nolan 1960), to at least 1 mile prior to their first fall migration (Gray and Greaves 1984).

The least Bell's vireo historically occupied willow riparian habitats from Tehama County, in northern California, southward to northwestern Baja California, Mexico, and as far east as Owens Valley, Death Valley, and the Mojave River (Grinnell and Miller 1944; Service 1998a). Although originally considered to be abundant locally, regional declines of this subspecies were noticeable by the 1940s (Grinnell and Miller 1944), and the least Bell's vireo was believed to have been extirpated from California's Central Valley by the early 1980s (Franzreb 1989). The San Joaquin and Sacramento Valleys were considered to be the center of the least Bell's vireo

breeding range (60 to 80 percent of the historical population; 51 FR 16474), but the species has not yet meaningfully re-colonized those areas. Except for a few outlying pairs, the least Bell's vireo is currently restricted to southern California south of the Tehachapi Mountains, and northwestern Baja California (Wilbur 1980; Garrett and Dunn 1981; Franzreb 1989). The largest current concentrations of least Bell's vireos are in San Diego County along the Santa Margarita River on Camp Pendleton and in Riverside County at the Prado flood control basin (Service 2006b).

Causes for decline of the least Bell's vireo included destruction or degradation of habitat, river channelization, water diversions, lowered water tables, gravel mining, agricultural development, and cowbird parasitism (Service 1998a, 2006b). Habitat losses have fragmented most remaining populations into small, disjunct, widely dispersed subpopulations (Franzreb 1989). Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds, in part by increasing incidence of nest predation and parasitism (Whitcomb et al. 1981). Least Bell's vireos nesting in areas containing a high proportion of degraded habitat have lower productivity (e.g., hatching success) than those in areas of high quality riparian woodland (Pike and Hays 1992).

The least Bell's vireo population in the U.S. has increased 10-fold since its listing in 1986, from 291 to 2,968 known territories (Service 2006b). The population has grown during each 5-year period since the original listing, although the rate of increase has slowed over the last 10 years. Population growth has been greatest in San Diego County and Riverside County, with lesser but significant increases in Orange County, Ventura County, San Bernardino County, and Los Angeles County. The population in Santa Barbara County has declined since the listing in 1986, although it is uncertain whether this population was historically significant. Kern, Monterey, San Benito, and Stanislaus counties have had a few isolated individuals and/or breeding pairs since the original listing, but these counties have not supported any sustained populations (Service 2006b).

The 1986 listing rule identified loss of habitat due to agricultural practices, urbanization, and exotic plant invasion as a major threat to least Bell's vireo populations. Since the listing of the least Bell's vireo, destruction and modification of riparian habitat within its current range has been curtailed significantly, primarily as a consequence of protections provided by the original listing in 1986 (51 FR 16474), the subsequent designation of critical habitat in 1994 (59 FR 4845), and other Federal and State regulatory processes. Other efforts not driven by regulatory processes have also promoted increased conservation and restoration of riparian habitat since the listing of the least Bell's vireo in 1986 (Service 2006b).

The 1986 listing rule also identified brood parasitism by cowbirds as a substantial threat to the least Bell's vireo, and parasitism of least Bell's vireo nests remains the most significant threat to the recovery of the subspecies (Service 2006b). Parasitized nests are either abandoned or fledge cowbird chicks rather than least Bell's vireos. Cowbirds did not historically occur within the least Bell's vireo's range, and therefore least Bell's vireos have not evolved adequate defenses to

avoid loss of productivity due to parasitism (Franzreb 1989). Extensive cowbird trapping and focused nest monitoring can substantially reduce parasitism or its effects over the short term within a limited area (Franzreb 1989; Service 1998a).

Draft Recovery Plan for the Least Bell's vireo

The 1998 draft recovery plan for the least Bell's vireo (Service 1998a) states that the goal of recovery efforts is the reclassification of the subspecies from endangered to threatened and, ultimately, delisting of the subspecies. The draft plan states that reclassification to threatened status may be considered when there are stable or increasing population/metapopulations of least Bell's vireos for a period of 5 consecutive years, each consisting of several hundred or more breeding pairs at the following sites: Tijuana River, Dalzura/Jamul Creek/Otay River, Sweetwater River, San Diego River, San Luis Rey River, Camp Pendleton/Santa Margarita River, Santa Ana River, an Orange County/Los Angeles County metapopulation, Santa River, Santa Ynez River, and an Anza Borrego Desert metapopulation. The draft plan states that each of these populations and metapopulations should be protected and managed.

The draft plan states that delisting of the least Bell's vireo may be considered when the subspecies meets the criterion for downlisting and there are stable or increasing least Bell's vireo population/metapopulations for a period of 5 consecutive years established at the following currently unoccupied areas of the subspecies' historical range: Salinas River, a San Joaquin Valley metapopulation, and a Sacramento Valley metapopulation. The draft plan states that each of these populations and metapopulations should be protected and managed.

Lastly, the draft plan states that threats to the least Bell's vireo at the aforementioned sites should be reduced or eliminated so that these populations/metapopulations are capable of persisting without significant human intervention, or perpetual endowments are secured for cowbird trapping and exotic plant control in riparian habitat occupied by the least Bell's vireos.

The draft recovery plan describes a strategy for reclassification, recovery, and delisting. Instrumental to this strategy is securing and managing riparian habitat within the historical breeding range of the least Bell's vireo, annual monitoring and range-wide surveys, and research activities necessary to monitor and guide the recovery effort.

Least Bell's vireo 5-Year Status Review

The Service completed a five-year status review for the least Bell's vireo in September 2006 (Service 2006b). The 5-year review reported a 10-fold increase in the least Bell's vireo population since listing. Substantial increases occurred in San Diego County, Riverside County, Orange County, Ventura County, San Bernardino County, and Los Angeles County, while Santa Barbara County appears to have experienced a decline. The 5-year review reiterates that nest parasitism by the brown-headed cowbird is the most important threat to the least Bell's vireo. While acknowledging that the least Bell's vireo has not met the downlisting criteria from the

draft recovery plan, the 5-year review determined that the sub-species is no longer in danger of extinction throughout all or a significant portion of its range, and recommended that the Service downlist the least Bell's vireo to threatened status.

Morro Shoulderband Snail

The Service listed the Morro shoulderband snail as endangered on December 15, 1994 (59 FR 64613) and published a recovery plan for the Morro shoulderband snail and four plants from western San Luis Obispo County in September 1998 (Service 1998b). The Service designated critical habitat for the species on February 7, 2001 (66 FR 9233). A 5-year status review for the Morro shoulderband snail and Chorro shoulderband snail was completed in 2006 (Service 2006a).

The Morro shoulderband snail is a member of the land snail family Helminthoglyptidae. The genus *Helminthoglypta*, the shoulderband snails of California, is a complex of many species, each with a relatively small range and, therefore, relatively vulnerable to extinction (Burke et al. 1999). Three other species in the genus have distributions similar to that of the Morro shoulderband snail. The Chorro shoulderband snail (*H. morroensis*) (Roth and Tupen 2004) may occur in close proximity or overlap with the range of the Morro shoulderband snail. The surf shoulderband snail (*H. fieldi*) is found in coastal dune habitats south of the San Luis Range to Point Arguello in Santa Barbara County, and does not occur sympatrically with the Morro shoulderband snail. The Big Sur shoulderband snail (*H. umbilicata*) occurs from Monterey Bay in Monterey County, south to northern Santa Barbara County, including the Los Osos area.

The recovery plan for the Morro shoulderband snail describes its current distribution as areas south of Morro Bay, west of Los Osos Creek, and north of Hazard Canyon (Service 1998b). We now know that the species occurs in a variety of native and non-native habitat throughout the community of Los Osos, undeveloped areas west and north of Los Osos, and in the dunes north of Morro Bay. Although the exact geographic range of the Morro shoulderband snail is uncertain, we do not expect it to extend much beyond the current known range (Walgren 2003).

As summarized in the final listing rule (59 FR 64613), the Recovery Plan (Service 1998b), and the 5-year review (Service 2006a) for the species, the Morro shoulderband snail is closely associated with Baywood fine sandy soils and appears to prefer shrubs in coastal dunes scrub that exhibit dense, low growth with ample contact to the ground. The species is found in accumulated leaf litter and on the undersides of lower shrub branches in coastal dune scrub vegetation. Common plant species with which the species is associated include mock heather (*Ericameria ericoides*), seaside golden yarrow (*Eriophyllum staechadifolium)*, deerweed (*Lotus scoparius*), dune lupine (*Lupinus chamissonis*), and dune almond (*Prunus fasciculata* var. *punctata*). However, Morro shoulderband snails also have been found in non-native iceplant (*Mesembryanthemum* spp. and *Conicosia puginoniformis*), fig-marigold (*Carpobrotus edulis*), veldt grass (*Ehrharta calycina*), and other forms of shelter previously thought to be unsuitable. These observations (Walgren 2003, SWCA 2013) indicate that the microclimate necessary for

species survival and reproduction is defined more by the physical structure of a plant species than presence of any particular plant species.

As dehydration is a major threat to terrestrial mollusks, shrub species are needed as partial shading and to provide windbreaks that reduce the drying effect of wind at ground level. Woody debris also provides shelter for Morro shoulderband snails. In the dry season, Morro shoulderband snails typically aestivate in accumulated leaf litter or attach to low-lying branches of shrubs. Snails in this genus aestivate by producing an epiphragm (a seal of dried mucus in the aperture of the shell) to reduce water loss during seasonal periods of inactivity (i.e., dry season). Although no studies have been conducted to determine how Morro shoulderband snails are affected when disturbed during aestivation, aestivating Morro shoulderband snails may suffer physical stress or even death upon disturbance of shrubs and accumulated leaf litter if subsequently exposed to drier, hotter, or otherwise more desiccating conditions.

Most active or non-aestivating Morro shoulderband snails are observed during damp environmental conditions when moisture availability likely facilitates the species' ability to find food and mates, as well as disperse and migrate. Roth (1985) also proposed that because the congeneric species, bronze shoulderband snail (*Helminthoglypta arrosa*), copulates, lays eggs, and grows in size during the wet season that Morro shoulderband snails would be expected to exhibit similar general life history characteristics. Based on our present understanding of the Morro shoulderband snail, we assume the following: (1) Morro shoulderband snails typically deposit their eggs under shrubs within the accumulated leaf litter or other areas that contain the appropriate microclimates; (2) Morro shoulderband snail eggs likely hatch the same wet season they are laid; and (3) Morro shoulderband snail eggs become nonviable if desiccation occurs.

The greatest threat to the Morro shoulderband snail is loss of habitat through partial or complete removal of native vegetation. Habitat loss, fragmentation, and degradation can result from urban development and invasion of habitat by non-native plant species, particularly veldt grass. Although the Morro shoulderband snail has been found in iceplant and veldt grass, non-native plant species can dominate to the exclusion of native plant species and render habitat unsuitable for Morro shoulderband snails.

Other threats to the species include direct trampling, soil disturbance, and soil compaction caused by horses, human activities, and off-road vehicles. Morro shoulderband snails may also be threatened by the application or spilling of chemicals, including pesticides, herbicides, fertilizers, and fire retardants. The senescence of dune vegetation may also threaten their survival as older shrubs that no longer make contact with the ground may not provide the necessary microclimate in terms of temperature and moisture. Morro shoulderband snails may be threatened by competition with non-native species, such as the brown garden snail (*Helix aspersa*) (Service 2006a).

Recovery Plan for the Morro Shoulderband Snail

The Service completed a recovery plan for the Morro shoulderband snail in 1998 (Service 1998b). The recovery plan identified threats to the species including development, invasion from nonnative plants, structural changes due to senescence of vegetation, recreational use, pesticides, parasites, and competition from non-native snail species. Downlisting of the species to threatened can be considered when (1) sufficient populations and suitable occupied habitat from all four conservation planning areas identified in the recovery plan have been secured and protected, and (2) populations of sufficient size to minimize short-term extinction (next 50 years) within any of the conservation planning areas have been secured and protected. Delisting can be considered when habitats from all of the conservation planning areas are successfully managed to maintain the desired community structure and are secured from the threats identified above.

Morro shoulderband snail 5-Year Status Review

The Service completed a five-year status review of the Morro shoulderband snail in 2006 (Service 2006a). The 5-year review reports that threats to the species have decreased substantially. In addition, the species' population is stable or increasing as occurrences and population numbers have grown since listing; however, this could be due to increased survey effort rather than an increase in the number of Morro shoulderband snails. Regardless, the downlisting criteria for the species have been met, because sufficient habitat has been protected, surveys for the species in potential habitat have been completed, and additional populations have been discovered. Development of management plans and increased protection from threats must occur before the delisting criteria are met. The 5-year review determined that the Morro shoulderband snail is no longer in danger of extinction throughout all or a significant portion of its range and recommended that the Service downlist the species' status to threatened.

Critical Habitat for the Morro Shoulderband Snail

Critical habitat for the Morro shoulderband snail was designated on February 7, 2001 (66 FR 9233). The designation included a total of 2,566 acres (as 3 units) in San Luis Obispo County, the only California County were the species occurs. All three units were considered to be occupied and subject to threats identified in the listing rule. A detailed discussion of the methods used in designating critical habitat can be found in the final rule.

All of the critical habitat units designated for the Morro shoulderband snail are within the species' historical geographic range and contain PCEs to support at least one of its essential life history functions. Based on our current knowledge of the species' life-history, biology, and ecology, we determined that the PCEs of critical habitat for the Morro shoulderband snail include:

1. Sand or sandy soils needed for reproduction;
2. A slope not greater than 10 percent to facilitate movement of individuals; and

3. The presence of native coastal dune scrub vegetation. This vegetation is typically, but not exclusively, represented by mock heather, buckwheat, eriastrum, chamisso lupine, dudleya, and in more inland locations, California sagebrush, coyote brush, and black sage.

Critical habitat for the Morro shoulderband snail is narrowly distributed around the cities of Morrow Bay and Los Osos. Portions of the species' critical habitat are on land owned by the State of California or local municipalities, and these areas receive some protection from development; however, these areas are still subject to disturbance from recreation and nonnative plants. Other critical habitat areas have been, and continue to be, degraded by increasing development, nonnative plant species (e.g., veldt grass (*Ehrharta calycina*), structural changes to its habitat due to maturing of dune vegetation, habitat fragmentation, and recreational use. The Program-specific critical habitat units are described in greater detail in the Environmental Baseline section of this document.

Tidewater Goby

The tidewater goby was listed as endangered on March 7, 1994 (59 FR 5494). On June 24, 1999, we proposed to remove the populations occurring north of Orange County, California, from the endangered species list (64 FR 33816). In November 2002, we withdrew this proposed delisting rule and decided to retain the tidewater goby's listing as endangered throughout its range (67 FR 67803). We originally designated critical habitat for the tidewater goby on November 20, 2000 (65 FR 69693). In November 2006, we proposed to revise that designation (71 FR 68914), and subsequently designated critical habitat in January 2008 (73 FR 5920). A recovery plan for the tidewater goby was completed on December 12, 2005 (Service 2005b) and a 5-year status review was completed on September 28, 2007 (Service 2007b).

Much of the information in this species account is summarized from Wang (1982), Irwin and Soltz (1984), Worcester (1992), Swenson and McCray (1996), Swift et al. (1989, 1993, 1997), Swenson (1995, 1999), and Lafferty et al. (1999a, 1999b).

The tidewater goby is a small, elongate, grey-brown fish rarely exceeding 2 inches standard length. The species, which is endemic to California, is typically found in coastal lagoons, estuaries, and marshes with relatively low salinities (approximately 10 parts per thousand (ppt)). Its habitat is characterized by brackish willow lagoons and lower stream reaches where the water is fairly still but not stagnant. However, tidewater gobies can withstand a range of habitat conditions; they have been documented in waters with salinity levels from 0 to 42 ppt, temperatures from 8 to 25 degrees Celsius, depths from 10 to 72 inches, and dissolved oxygen levels of less than 1 milligram per liter.

Tidewater gobies often migrate upstream into fresh water, up to 0.5 mile from the estuary. However, in Ten Mile River, Mendocino County, and San Antonio Creek and the Santa Ynez River, Santa Barbara County, tidewater gobies are often collected 3 to 5 miles upstream of the

tidal or lagoonal areas, sometimes in sections of stream impounded by beavers (*Castor canadensis*). Conversely, tidewater gobies enter marine environments if sandbars are breached during storm events. The species' tolerance of high salinities (up to 60 ppt for shorter time periods) likely enables it to withstand the marine environment, allowing it to colonize or reestablish in lagoons and estuaries following flood events (Lafferty et al. 1999a and 1999b).

The tidewater goby is primarily an annual species in central and southern California, although some variation in life history has been observed. If reproductive output during a single season fails, few (if any) tidewater gobies survive into the next year. Reproduction typically peaks from late April or May to July and can continue into November or December depending on the seasonal temperature and amount of rainfall. Males begin the breeding ritual by digging burrows (3 to 4 inches deep) in clean, course sand of open areas. Females then deposit eggs into the burrows, averaging 400 eggs per spawning effort. Males remain in the burrows to guard the eggs. They frequently forego feeding, which may contribute to the mid-summer mortality observed in some populations. Within 9 to 10 days, larvae emerge and are approximately 0.20 to 0.27 inch in length. They live in vegetated areas in the lagoon until they are 0.60 to 0.70 inch long. When they reach this life stage, they become substrate-oriented, spending the majority of time on the bottom rather than in the water column. Both males and females can breed more than once in a season, with a lifetime reproductive potential of 3 to 12 spawning events. Vegetation is critical for over-wintering tidewater gobies because it provides refuge from high water flows.

Tidewater gobies feed on small invertebrates, including mysids, amphipods, ostracods, snails, aquatic insect larvae, and particularly chironomid midge larvae. Tidewater gobies of less than 0.30 inch probably feed on unicellular phytoplankton or zooplankton similar to many other early stage larval fishes.

Historically, the tidewater goby occurred in at least 134 California coastal lagoons and estuaries from Tillas Slough near the Oregon border south to Agua Hedionda Lagoon in northern San Diego County. The southern extent of its distribution has been reduced by approximately 8 miles. The species is currently known to occur in about 98 locations, although the number of sites fluctuates with climatic conditions. Currently, the most stable populations are in lagoons and estuaries of intermediate size (5 to 124 acres) that are relatively unaffected by human activities. Tidewater gobies that are found upstream of the lagoons in summer and fall tend to be juveniles. The highest densities of tidewater gobies are typically present in the fall.

Local populations of tidewater gobies are best characterized as metapopulations. Local tidewater goby populations occupy coastal lagoons and estuaries that in most cases are frequently isolated from other local populations by open ocean and other extensive areas of unsuitable habitat. Very few tidewater gobies have ever been captured in the marine environment, which suggests this species rarely occurs in the open ocean. Studies of the tidewater goby suggest that some populations persist on a consistent basis, while others appear to experience intermittent extirpations. These extirpations may result from one or a series of factors, such as the drying up

of some small streams during prolonged droughts. Some of the areas where tidewater gobies have been extirpated apparently have been recolonized when extant populations were present within a relatively short distance of the extirpated population (i.e., less than 6 miles). These recolonization events suggest that tidewater goby populations exhibit a metapopulation dynamic where some populations survive or remain viable by continually exchanging individuals.

Native predators are not known to be important regulators of tidewater goby population size in the lagoons of southern California. Rather, population declines are attributed to environmental conditions. During high flows, streams flood and breach lagoon barriers, which creates strong tidal conditions that cause goby populations to plummet. Populations typically recover quickly in summer, with mean densities of between anywhere from 54 to 323 fish per square foot. Tidewater goby densities are greatest among emergent and submergent vegetation (Moyle 2002).

The decline of the tidewater goby is attributed primarily to habitat loss or degradation resulting from urban, agricultural, and industrial development in and around coastal wetlands. Tidewater gobies have been extirpated from water bodies that are impaired by degraded water quality (e.g., Mugu Lagoon, Ventura County), but still occur in others (e.g., Santa Clara River, Ventura County). Some extirpations are believed to be related to pollution, upstream water diversions, and the introduction of non-native predatory fish species (most notably, centrarchid sunfish and bass). These threats continue to affect some of the remaining populations of tidewater gobies (Service 2007b).

Recovery Plan for the Tidewater Goby

The Service completed a recovery plan for the tidewater goby in 2005 (Service 2005b). The goal of the recovery plan is to conserve and recover the tidewater goby throughout its range by managing threats and perpetuating viable metapopulations within each recovery unit while maintaining morphological and genetic adaptations to regional and local environmental conditions. The decline of tidewater gobies is attributed primarily to habitat loss or degradation resulting from urban, agricultural, and industrial development in and around coastal wetlands. The recovery plan identifies 6 recovery units: North Coast Unit, Greater Bay Unit, Central Coast Unit, Conception Unit, Los Angeles/Ventura Unit, and South Coast Unit.

The recovery plan specifies that the tidewater goby may be considered for downlisting when:

1. Specific threats to each metapopulation (e.g., coastal development, upstream diversion, channelization of rivers and streams, etc.) have been addressed through the development and implementation of individual management plans that cumulatively cover the full range of the species.
2. A metapopulation viability analysis based on scientifically credible monitoring over a 10-year period indicates that each recovery unit is viable. The target for downlisting is for individual sub-units within each recovery unit to have a 75 percent or better chance of persistence for a minimum of 100 years.

The tidewater goby may be considered for delisting when downlisting criteria have been met and a metapopulation viability analysis projects that all recovery units are viable and have a 95 percent probability of persistence for 100 years.

Tidewater goby 5-Year Status Review

The Service completed a 5-year status review for the tidewater goby in 2007 (Service 2007b) and stated that the recovery plan reflects up-to-date information; however, the 5-year review reconsidered the downlisting and delisting criteria in the recovery plan. The 5-year review stated that other, currently available information on the species may be used to determine the appropriate listing status of the species under the Act. These include the current number of occupied localities, current laws and regulations that act to protect the species, and our current understanding of threats and their impact on tidewater gobies. In the 5-year review, we recommended reclassifying tidewater gobies from endangered to threatened, because the species was not in imminent danger of extinction. We reached this conclusion and recommendation, because the number of localities known to be occupied had more than doubled since listing. In addition, the 5-year review concluded that tidewater gobies may be more resilient in the face of severe drought events than believed at the time of listing, and that threats identified at the time of listing had been reduced or were not as serious as once thought.

Critical Habitat for the La Graciosa Thistle

The Service designated critical habitat for La Graciosa thistle on March 17, 2004 (69 FR 12553) and published a revised critical habitat designation on November 3, 2009 (74 FR 56978). A total of 24,103 acres (as 6 units) were designated as critical habitat for the La Graciosa thistle in 2 California counties (San Luis Obispo and Santa Barbara). A detailed discussion of the methods used in designating critical habitat can be found in the final rule.

All of the areas of critical habitat for the La Graciosa thistle are within the species' historical geographic range and contain PCEs to support at least one of the species' essential life history functions. Based on our current knowledge of the life history, biology, and ecology of the La Graciosa thistle, we determined that the PCEs of La Graciosa thistle critical habitat consist of:

1. Mesic areas associated with: (a) margins of dune swales, dune lakes, marshes, and estuaries that are associated with dynamic (changing) dune systems including the Santa Maria Valley Dune Complex and Santa Ynez Valley Dune Complex; (b) margins of dynamic riparian systems including the Santa Maria and Santa Ynez Rivers and Orcutt and San Antonio Creeks; and (c) freshwater seeps and intermittent streams found in other habitats, including grassland, meadow, coastal scrub, chaparral, and oak woodland. These areas provide space needed for individual and population growth including sites for germination, reproduction, seed dispersal, seed bank, and pollination.
2. Associated plant communities including central dune scrub, coastal dune, coastal scrub, freshwater seep, coastal and valley freshwater marsh and fen, riparian scrub (e.g., mule

fat scrub, willow scrub), oak woodland, intermittent streams, and other wetland communities, generally in association with the following species: rush (*Juncus* spp.), tule (*Scirpus* spp.), willow (*Salix* spp.), poison oak (*Toxicodendron diversilobum*), salt grass (*Distichlis spicata*), coyote brush (*Baccharis pilularis*), and Douglas' Baccharis (*B. douglasii*).

3. Soils with a sandy component including but not limited to dune sands, Oceano sands, Camarillo sandy loams, riverwash, and sandy alluvial soils.
4. Features that allow dispersal and connectivity between populations, particularly: (a) natural riparian drainages in Santa Maria River, Orcutt Creek, San Antonio Creek, and Santa Ynez River that are not channelized or confined by barriers or dams, such that they have soft bottoms and sides and a natural flood plain (allowing uninterrupted water flows); and (b) natural aeolian geomorphology in the Santa Maria Dune Complex and Santa Ynez Dune Complex, and along the Santa Maria River, Orcutt Creek, San Antonio Creek, and Santa Ynez River drainages that is not confined by barriers or wind-blocks such as large manmade structures, tree rows, or windbreaks (allowing uninterrupted winds across these areas).

Critical habitat for the La Graciosa thistle occurs in the Santa Maria River and in and adjacent to the dune complex between the Santa Maria River and Arroyo Grande Creek, including a portion of Oso Flaco Creek. Portions of the species' critical habitat are on Guadalupe Dunes National Wildlife Refuge and Oceano Dunes Natural Preserve, and these areas receive protection from development and intense recreation. The balance of the species' critical habitat has been, and continues to be, disturbed by off-road vehicle activity, recreation, oil exploration, livestock grazing, agriculture, and installation and maintenance of roads and other transportation corridors. The program-specific critical habitat unit is described in greater detail in the Environmental Baseline section of this document.

Critical Habitat for the Camatta Canyon Amole

The Service designated critical habitat for the Camatta Canyon amole on October 24, 2002 (67 FR 65414). The designation included 4,378 acres (as 1 unit) of critical habitat in 1 California county (San Luis Obispo). A detailed discussion of the methods used in designating critical habitat can be found in the final rule.

All of the areas of critical habitat for the Camatta Canyon amole are within the species' historical geographic range and contain PCEs to support at least one of the species' essential life history functions. Based on our current knowledge of the species' life history, biology, and ecology, we determined that the PCEs of Camatta Canyon amole critical habitat consist of:

1. Well-drained, red clay soils with a large component of gravel and pebbles on the upper soil surface; and
2. Plant communities in functioning ecosystems that support associated plant and animal species (*e.g.*, pollinators, predator-prey species, etc.), including grassland.

Critical habitat for the Camatta Canyon amole has been, and continues to be, lost or disturbed by off-road vehicle activity, recreation, road construction and maintenance, invasive plant species, and livestock grazing. A portion of the critical habitat unit is managed by LPNF but is not completely protected from these impact mechanisms. The portion of the critical habitat unit specific to the Program is described in greater detail in the Environmental Baseline section of this document.

ENVIRONMENTAL BASELINE

Service regulations define the action area as "all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The action area for this consultation is all of San Luis Obispo County, excluding land owned by the Federal government (e.g., Los Padres National Forest). Because the exact locations of specific projects or their size is unknown, we cannot limit the action area beyond the exclusions listed here.

Overview of the Program Area

San Luis Obispo County encompasses an area of approximately 2,114,765 acres. Agriculture is the dominant land use; approximately 80 percent of the County (1,691,810 acres) is in some form of agriculture. Grazing land occupies approximately 90 percent of the agricultural land in the County. Because agriculture is so widespread, conservation activities installed under the Program are expected to lead to significant water quality and habitat improvements throughout the County.

The Program will be applicable to privately-owned and non-Federal, publically owned lands, mainly agriculturally property, within San Luis Obispo County. However, the Program will not include the following areas:

- Areas within vernal pools
- Lands and submerged areas under direct jurisdiction of the California Coastal Commission (such as estuaries, harbors and bays)
- Ocean coastline and beaches
- Any area site that does not comply with all associated practice conditions, limitations, and mitigation measures of the Project.
- Specific geographic areas identified by consultation with the Service, NMFS and CDFG as sensitive where impacts cannot be avoided or minimized to less than significant.

We relied heavily on the NRCS' biological assessment (NRCS 2010) to compile the climate, vegetation, and watershed descriptions in the following three sections. Other data sources are cited in the text.

Climate and Topography

The topography and climate of San Luis Obispo County are extremely diverse, leading to the existence of a wide variety of habitat types, flora, and fauna within the County. There are four major mountain ranges traversing the County, generally running in a north to southeasterly direction. The topography ranges from steep, rugged ridges to rolling hills, stream terraces, and gently sloping valley floors. The Salinas River and its tributaries carry approximately 50 percent of the surface water within the County. Elevations range from sea level on the coast, to 4,300 feet in the northeast boundary. The large Carrizo Plains Valley, consisting of gently sloping alluvial soils, drains to an inland alkali body of water known as Soda Lake.

The climate in the region is Mediterranean, typically consisting of dry summers and cool, wet winters. Annual rainfall averages between 8 inches in the Carrizo Plains and 50 inches in the Santa Lucia Mountains.

Vegetation

There are 10 broad native terrestrial plant communities within the California floristic province, including estuarine wetlands, beach and dunes, riparian forests, coastal prairie, coastal sage scrub, oak woodlands, chaparral, valley grasslands, vernal pools, and southern California conifer forests. Some of the principal plant communities present in the County are summarized below. Estuarine wetlands, beach and dunes, and vernal pools are beyond the scope of this Program, and as such, will not be further discussed in this section.

Freshwater Marsh
Freshwater marshes are characterized by cattails, rushes, and sedges and support a variety of animal species. One of the few remaining natural freshwater marshes in this area used by migratory waterfowl is Black Lake Canyon. There are several freshwater marshes spread out throughout the County.

Chaparral
Chaparral is widespread throughout the County and occurs on many different types of soils. Chaparral is also typically found in older sand dunes and composed mainly of evergreen woody shrub species. Chaparral plants form dense thickets and are adapted to drought conditions and large wildfires. Dominant plant species include Ceanothus (*Ceanothus* spp.), manzanita (*Arctostaphylos* spp.), coyote brush (*Baccharis pilularis*), chamise (*Adenostoma fasciculatum*), monkey flower (*Mimulus* spp.), and sage (*Salvia* spp.). Central maritime chaparral, also known as Sandhill or Burton Mesa chaparral, is a unique form of chaparral that is highly restricted in its distribution and supports a high number of endemic plants in the County. Plant series that can be found in the maritime chaparral habitats of the County, particularly in the Los Osos area, include the federally threatened Morro manzanita (*Arctostaphylos morroensis)* and federally endangered Indian Knob mountain balm (*Erodictyon altissimum*).

Coastal Sage Scrub

This plant community is comprised of drought-tolerant, shallow-rooted shrubs such as California sagebrush (*Artemisia californica*); black, purple, and white sage (*Salvia mellifera, S. leucophylla, S. apiana*); California buckwheat (*Eriogonum fasciculatum*); and California encelia (*Encelia californica*). Coastal sage scrub is generally found in the lower elevations of both the coastal and interior regions of the mountains.

Grassland

Native grasslands once covered one fifth of the state, but are now considered very rare, as they have been reduced to only 0.1 percent of the cover type in California. Many of the County's native grasslands have been converted to grazing and are now dominated by introduced annual grasses such as fescues and bromes. Within the County, there are still some relatively intact native grassland habitats found in certain portions of the Carrizo Plain and Montana De Oro State Park.

Oak Woodlands and Forests

Three types of oak woodlands occur in the County: valley oak (*Quercus lobata*), coast live oak (*Q. agrifolia*), and blue oak (*Q. douglasii*) woodlands. Valley oak woodlands are characterized by scattered trees surrounded by grassland and tend to be found in the interior valleys of the County; whereas trees in live oak and blue oak woodlands tend to be more closely spaced and interspersed with other trees and shrubs. Coast live oak woodlands are found on north-facing slopes throughout the coastal ranges and the foothills of these inner coast ranges are generally dominated by blue oak and grey pine (*Pinus sabiniana*). Other species associated with oak woodlands include redbud (*Cercis occidentalis)*, coffeeberry (*Rhamnus californica*), toyon (*Heteromeles arbutifolia*), mistletoe (*Phoradendron macrophyllum)*, poison oak (*Toxicodendron diversilobum)*, lichens, forbs, and grasses. These oak woodland communities support diverse wildlife populations.

Monterey Pine Forest

Endemic to coastal California, Cambria's Monterey pine (*Pinus radiata*) forest is one of only three native stands left in the state and five left in the world. This maritime closed cone forest community also includes the bishop pine (*Pinus muricata*) and coast live oak; however, the size of the Monterey pines and canopy cover often limits the growth of other plant species within this community. Fire is an integral part of the Monterey pine community. Many animal species use this community for foraging and shelter.

Major Watersheds

San Luis Obispo County watersheds within the action area are distinguished by the County’s hydrologic units (HU), which are the Estero Bay, Salinas, Estrella River, Santa Maria, and Carrizo Plain Watershed.

Coastal Watersheds of Estero Bay

The watersheds of Estero Bay form an ecologically rich and diverse region encompassing approximately 751 square miles along the coast from Arroyo Grande to San Simeon. The watersheds include several coastal streams: Arroyo De La Cruz, San Simeon Creek, Santa Rosa Creek, Morro Creek, Chorro Creek, San Luis Obispo Creek, and Arroyo Grande Creek. The Estero Bay watershed, which is recognized as a globally significant hotspot for terrestrial biodiversity, consists of riparian corridors, coastal chaparral, oak grasslands, agriculture lands, and relatively limited urbanization.

Salinas Watershed

This watershed encompasses the cities of San Miguel, Paso Robles, Templeton, Atascadero, Santa Margarita, and Creston; and includes the Salinas River, Nacimiento River, Atascadero Creek, Santa Margarita Lake, San Antonio River, Cholame Creek, Santa Margarita Creek, Yerba Buena Creek, San Juan Creek, Huerohuero Creek, and Lake Nacimiento, among others. The Salinas River and its tributaries drain approximately 75 percent of the watershed area and flow directly into the Monterey Bay National Marine Sanctuary.

The primary land use is agriculture and grazing land, leading to high nitrate levels in the surface waters of the Salinas Watershed. Other issues affecting the Salinas Watershed include siltation, water diversions, migration barriers for salmonids, and unnaturally high water temperatures due to lack of vegetative cover. Elevations in this watershed range from sea level on the coast to 600 feet in the Salinas River Valley to 4,300 feet in the northeast boundary.

The Paso Robles groundwater basin, connected to the Salinas River underground flow, is the main source for agricultural and urban water needs in the area and is estimated to be in overdraft by 7 to 11 feet per year. This watershed has poor water quality overall, much of which can be attributed to growing urban, suburban, agricultural and industrial development. Sand and gravel mining operations and runoff from historic mercury mines threaten the Salinas and tributary channels. The Salinas River and its tributaries are also heavily used by off-road enthusiasts, vegetation is being removed along much of the channel, and pesticides and fertilizers from surrounding urban and rural land drain into the riparian corridor, all of which adversely impact water and habitat quality. As a result, the State Water Resources Control Board has designated the Salinas River as an impaired water body under Section 303(d) of the Clean Water Act.

American Watersheds and the RCD, in cooperation with NRCS, CDFG, and the Regional Board, are working to improve the conditions of the Salinas River. Projects have been implemented on Atascadero and the Little Cholame Creeks to arrest erosion and improve the habitat conditions of these creeks. The Program would help in this effort.

Estrella River Watershed

The Estrella River Watershed is located in northeastern San Luis Obispo County and crosses the county lines of both Monterey and Kern Counties. The Estrella River flows west-northwest to the Salinas and is formed at the confluence of Cholame Creek, from the north, and San Juan

Creek, from the south, near the town of Shandon. The Estrella River Watershed is surrounded by several mountain ranges and low hills, including the Cholame Hills, the Diablo Range, Temblor Range, and La Panza Range.

The soils throughout this watershed range from silty clays to coarse sandy loams and are derived from weathered sandstone, shale, and alluvium. The landscape is influenced by movement along the San Andreas Fault, which runs through the Cholame Valley and the town of Parkfield. Agricultural production, including grazing, production of grain and hay, and irrigated vineyards and orchards, is the predominant land use within the Estrella River Watershed. The land within the watershed is mostly privately owned.

Carrizo Plain

The Carrizo Plain is a closed watershed, and all surface water drains to Soda Lake. Soda Lake is an ephemeral alkaline wetland and is one of the largest undisturbed alkali wetlands in the State, providing important habitat for migratory birds, including shorebirds, waterfowl, and a quarter of the State's wintering sandhill crane population. The Carrizo Plain is the largest remaining tract of the San Joaquin Valley biogeographic province with only limited evidence of human alteration. The 250,000-acre area is a diverse complex of habitats that includes the largest remaining contiguous habitats for many endangered, threatened, and rare species of animals such as the San Joaquin kit fox, blunt-nosed leopard lizard, San Joaquin antelope squirrel, giant kangaroo rat, California jewelflower, Hoover´s wooly-star, and San Joaquin woolythreads. The predominant industries are farming and ranching. Most of the mountainous regions in the basin are public lands managed by the U.S. Forest Service or the Bureau of Land Management.

Santa Maria River Watershed

The Santa Maria River Watershed encompasses the Cuyama River basin and the Santa Maria/Sisquoc River basin. The westerly flowing Cuyama River starts in Ventura County and drains portions of northern Santa Barbara County, a large portion of southern San Luis Obispo County, and Kern County and also is the boundary line between San Luis Obispo County and Santa Barbara County, along with the coastal portion of the Santa Maria River. The Cuyama River meets the Sisquoc River near the town of Garey, at which point both rivers become the Santa Maria River, which flows to the ocean. Twichell Dam is located several miles upstream of the point of confluence.

The Cuyama Valley is bordered on the north by the Caliente Mountain range and on the south by the Sierra Madre Mountains. The elevation in the Sierra Madre Ridges bordering the south end of the valley is between 1,400 and 5,875 feet. The climate is arid with hot, dry summers, and cool winters.

Approximately 182 stream miles (primarily along the Cuyama River) in the watershed are listed as water-quality impaired, with boron being the primary pollutant. Other affected streams are Bradley Canyon Creek and Bradley Channel for pathogens and nutrients; Orcutt Creek for

nutrients, pesticides, pathogens, and boron; Santa Maria River for nutrients, pesticides, and pathogens; and Alamo Creek for pathogens, among others.

Baseline of Federally Listed Species and Critical Habitat in the Program Area

San Luis Obispo County contains current and historical occurrences of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, and tidewater. The general distribution and, in some cases, documented population trends or recent occurrence information, for each of these species within San Luis Obispo County are described below.

California Red-legged Frog

San Luis Obispo County supports stable populations of California red-legged frogs; the species has been documented in all of the major watersheds in the action area and in many of the smaller watersheds. California red-legged frogs are found in many streams, stock ponds, dune ponds, and springs on the coastal plain and western slopes of the Santa Lucia Range from San Carpoforo Creek in the north to the Santa Maria River in the south. California red-legged frogs are also known to occur in Pico Creek, Little Pico Creek, Pico Pond, San Simeon Creek, Santa Rosa Creek, Toro Creek, Chorro Creek, Morro Creek, and Arroyo Grande Creek. On Camp San Luis Obispo of the California National Guard, frogs occur in Whiskey Spring, tributaries to Chorro Creek and Chorro Reservoir, and other sites. The species could occur in, or within a few hundred feet of, any freshwater habitat throughout the action area; however, aquatic habitat degraded by introduced predators, pollution, or continuous disturbance may be unsuitable for occupation.

As described in the California red-legged frog recovery plan, the action area contains portions of three recovery units and four core areas (Service 2002). Both the recovery units and core areas are known to be occupied by the California red-legged frog. Within the recovery units (Central Coast, Diablo Range/Salinas Valley, Northern Transverse Ranges/Tehachapi Mountains), threats to the species include agriculture, non-native species, livestock, mining, recreation, logging, urbanization, and water management. Because the action area excludes portions of the County, some of these threats may not be present in the action area. The action area also contains all, or portions of, four core areas (Estero Bay, Arroyo Grande Creek, Santa Maria River – Santa Ynez River, Estrella River) that, when protected and managed for the California red-legged frog, will allow for long-term viability of existing populations and reestablishment of populations within the historical range. Preservation and enhancement of each core area is important to maintain and expand the distribution of the species (Service 2002).

Loss of habitat and the introduction of aquatic predators/competitors, including the bullfrog, catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquito fish, red swamp crayfish (*Procambarus clarkii*), and signal crayfish (*Pacifastacus leniusculus*), have reduced populations

of the California red-legged frog throughout its range, including the watersheds of San Luis Obispo County. Substantial California red-legged frog aquatic and upland habitat has been degraded or lost in the Salinas River and Estrella River watersheds, and to a lesser extent, the Estero Bay watersheds. The species has experienced a reduction in the amount of available breeding, foraging, and dispersal habitat, as well as a reduction in water quality of stream and river areas adjacent to urban development and agriculture. Habitat disturbances include the direct and indirect effects of urbanization, streambed alteration, conversion to agricultural croplands, and degradation to various extents by livestock activity. Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations. Chytrid is present in the County and is considered a threat to California red-legged frog populations.

Critical Habitat for the California Red-legged Frog

The action area contains 180,240 acres in 4 units of critical habitat for the California red-legged frog (75 FR 12816):

SLO-1, Cholame
This unit is comprised of approximately 18,018 acres of land and is located in northeastern San Luis Obispo, northwestern Kern, and southwestern Kings Counties. It includes locations in the Cholame Creek drainage and is mapped from occurrences recorded at, and subsequent to, the time of listing. The unit consists of both Federal and private lands and includes portions of the following watersheds: the southern portion of Blue Point, the western portion of Jack Canyon, and the eastern portion of Palo Prieto Canyon. Unit SLO-1 contains the features that are essential for the conservation of the species, including aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). The physical and biological features essential to the conservation of California red-legged frog in the SLO-1 unit may require special management considerations or protection due to highway construction, overgrazing, and water diversions, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults.

SLO-2, Piedras Blancas to Cayucos Creek
This unit contains approximately 82,673 acres of land and is located along the coast in northwestern San Luis Obispo County from approximately Arroyo de Los Chinos southward to just before, but not including, Whale Rock Reservoir. The unit consists of Federal, State, and private lands and includes the following watersheds: Arroyo de los Chinos, Lower Arroyo de la Cruz, Arroyo del Corral, Oak Knoll Creek, Broken Bridge Creek, Pico Creek, Upper San Simeon Creek, Lower San Simeon Creek, Steiner Creek, Upper Santa Rosa Creek, Lower Santa Rosa Creek, and Lower Green Valley Creek. The unit is occupied by the species and is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. Unit SLO-2 contains aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging and dispersal activities (PCE 3 and PCE 4). Unit SLO-2 provides connectivity within the Santa Lucia Range, and between this range and the inner Coast Range in

San Luis Obispo County. The physical and biological features essential to the conservation of California red-legged frog in the SLO-2 unit may require special management considerations or protection due to predation by nonnative species, water diversion, overgrazing, and urbanization, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults due to habitat modification. A portion of the lands containing features essential to the conservation of the California red-legged frog in Unit SLO-2 has been excluded from critical habitat designation under section 4(b)(2) of the Act.

SLO-3, Willow and Toro Creeks to San Luis Obispo

This unit contains approximately 116,517 acres of land and is located near the coast in central San Luis Obispo County. It extends from about 1.9 miles north of the town of Morro Bay southward to just east of the city of San Luis Obispo. The unit consists of Federal, State, and private lands and includes the following watersheds: Old Creek, Whale Rock Reservoir, the southern portion of Hale Creek, Morro Bay, San Luisito Creek, the western and southern portions of Santa Margarita Creek, Chorro Reservoir, Stenner Lake, Reservoir Canyon, Trout Creek, and Big Falls Canyon. The unit is mapped from occurrences recorded at the time of listing and subsequent to the time of listing. Unit SLO-3 contains the features that are essential for the conservation of the species. The unit is currently occupied by the California red-legged frog and contains permanent and ephemeral aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for foraging, dispersal, and shelter (PCE 3 and PCE 4). Unit SLO-3 provides connectivity within the Santa Lucia Range, and between this range and the inner Coast Range in San Luis Obispo County. The physical and biological features essential to the conservation of California red-legged frog in the SLO-3 unit may require special management considerations or protection due to predation by nonnative species, water diversion, overgrazing, and urbanization, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or adults due to habitat modification. A portion of the lands containing features essential to the conservation of the California red-legged frog in Unit SLO-3 has been excluded from critical habitat designation under section 4(b)(2) of the Act.

SLO-4, Upper Salinas River

This unit contains approximately 34,463 acres of land, is located at the base of Garcia Mountain about 17 miles east of the city of San Luis Obispo, is mapped from occurrences recorded subsequent to the time of listing, and is currently occupied by the species. The unit consists of Federal and private lands and includes the following watersheds: Horse Mesa, Douglas Canyon, American Canyon, and Coyote Hole. This unit is essential for the conservation of the species because it is the only unit in San Luis Obispo County entirely within the interior Coast Range and provides connectivity between populations in the coastal areas and populations farther inland. Unit SLO-4 also contains permanent and ephemeral aquatic habitats consisting of natural and manmade ponds surrounded by emergent vegetation and marshland with upland dispersal habitat comprised of riparian areas for dispersal, shelter, and foraging. The physical and biological features essential to the conservation of California red-legged frog in the SLO-4 unit may require special management considerations or protection due to predation by nonnative species, and due to water diversion, overgrazing, and urbanization, which may alter aquatic or

upland habitats and thereby result in the direct or indirect loss of egg masses or adults due to habitat modification.

California Tiger Salamander

According to the 2003 Proposed Listing Rule (68 FR 13498) for the Central Population of California tiger salamander, approximately 12 percent (72 of the 608 localities) of the known California tiger salamander records are in the Central Coast Range population, which includes southern Santa Cruz, Monterey, extreme western San Benito, extreme western Fresno, extreme western Kings, extreme northwestern Kern, and San Luis Obispo Counties. Nineteen of these sites in the Central Coast population are considered extirpated (CNDDB 2011, 68 FR 13498). According to CNDDB, there are 5 known occurrences of California tiger salamanders in the action area, all of which are presumed extant (CNDDB 2013). The occurrences include locations near Twisselmann Lake, O'Brian Lake, and Grant's Lake along the Palo Prieto Pass; Kerr Lake near the Monterey/San Luis Obispo County border; and near Bitterwater Road along the Palo Prieto Pass. We expect this species to occur in other inland locations within the action area, but there is a lack of survey data for this species throughout the remaining portions of the County.

As noted in the listing rule, significant portions of native habitat have been and continue to be converted to urban and agricultural uses in San Luis Obispo County. According to the final listing rule for the species (69 FR 47212), there were approximately 936,204 acres of potential habitat for the California tiger salamander in the Central Coast in 2004. California tiger salamanders in this population occurred predominantly in stock ponds, reservoirs, seasonal lakes, and intermittent streams. Of the California tiger salamander localities in this population where these wetland types were identified, 26 percent (86) were vernal pools. The annual loss of vernal pools from 1994 to 2000 in Monterey, San Benito, San Luis Obispo, Santa Barbara, and Ventura Counties appears to be occurring at a rate of 2 to 3 percent annually (Holland 2003).

Critical Habitat for the California Tiger Salamander

The action area contains 6,623 acres in one critical habitat unit for the California tiger salamander: Unit 6, Choice Valley. This unit includes privately owned land and is essential to the conservation of the species, because it is needed to maintain the current geographic and ecological distribution of the species within the Central Coast Geographic Region. Unit 6 represents the very southern extension of the species' range in the Central Coast Geographic Region and is the only unit within the Carrizo vernal pool region. It contains all three of the PCEs and four extant occurrences of the species. Unit 6 is located in an area north of the Carrisa Highway, east of Antelope Valley, south of Cottonwood, and west of Shandon. Threats include 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.

Vernal Pool Fairy Shrimp

In the action area, the species has been found in the Carrizo Vernal Pool Region near Camp Roberts and in the vicinity of Soda Lake on the Carrizo Plain. We anticipate that the species also could occur in suitable habitat between these two areas. According to CNDDB, there are a total of 22 extant occurrences of vernal pool fairy shrimp throughout San Luis Obispo County, most of which occur in the northeast portion of the county (CNDDB 2011); however, the occurrences on federally-owned land are not included in the action area.

Vernal pool habitats supporting populations of vernal pool fairy shrimp have been protected through a variety of means. Within the Carrizo Vernal Pool Region, some of the vernal pool fairy shrimp habitat is protected from training and maintenance activities on the Camp Roberts military base. Likewise, there are numerous vernal pools that have been preserved in the Carrizo Plain through large land acquisitions over the last few years. However, vernal pool fairy shrimp in the action area are still threatened by habitat loss, fragmentation, alteration, and degradation as a result of changes to natural hydrology, competition from invasive species, incompatible grazing regimes, infrastructure projects, recreational activities, erosion, mosquito abatement activities, climatic and environmental change, and contamination. Most recently, development of the California Valley Solar Ranch is expected to cover 4,691 acres, much of it in the Carrizo Plain just northeast of the CPNM. While the development is expected to avoid ephemeral pools, direct and indirect effects to the species are likely. This development includes destruction of 515 acres of critical habitat for the vernal pool fairy shrimp.

Longhorn Fairy Shrimp

The longhorn fairy shrimp is extremely rare and is known from only a small number of widely separated populations including two areas in eastern and southeastern San Luis Obispo County (Service 2005a). In the action area, longhorn fairy shrimp are currently found in pools located within a matrix of alkali sink and alkali scrub plant communities north and northwest of Soda Lake just outside the CPNM. Longhorn fairy shrimp in the action area are threatened by habitat loss and fragmentation from small-scale residential development, large scale solar energy development, habitat degradation as a result of changes to natural hydrology, and recreational activities. Most recently, development of the California Valley Solar Ranch is expected to cover 4,691 acres, much of it in the Carrizo Plain just northeast of Soda Lake. While the development is expected to avoid ephemeral pools, direct and indirect effects to the species are likely. This development includes destruction of 515 acres of critical habitat for the longhorn fairy shrimp.

Critical Habitat for the Vernal Pool Fairy Shrimp and Longhorn Fairy Shrimp

The action area contains 48,529 acres in seven critical habitat units for the vernal pool fairy shrimp (Units 29C through 29H and 30) located in the northern part of the County, and 9,601 acres in one longhorn fairy shrimp critical habitat unit (Unit 3) located off Highway 58 in the

Carrizo Plain. Vernal pool fairy shrimp critical habitat Unit 30 and longhorn fairy shrimp critical habitat Unit 3 are identical.

Critical habitat in the action area is threatened by habitat loss and fragmentation and habitat alteration and degradation as a result of agriculture, development, changes to natural hydrology, competition from invasive species, incompatible grazing regimes, infrastructure projects, recreational activities, erosion, mosquito abatement activities, climatic and environmental change, and contamination. A large portion of Unit 30/3 is disturbed by a semi-abandoned development project called California Valley that includes scattered residential development and a graded grid of dirt roads. Although the development in this area is currently scattered and small in scale, it may have directly damaged vernal pools and altered the hydrology of the vernal pool complex. We are unaware of the extent to which development in this area will continue in the future. Recently, conversion of a portion of the California Valley area to a solar energy facility began. Development of the California Valley Solar Ranch is expected to cover 4,691 acres, much of it in the Carrizo Plain just northeast of Soda Lake. This development includes destruction of 515 acres of critical habitat for the vernal pool fairy shrimp and longhorn fairy shrimp. This is approximately 1 percent of critical habitat for the vernal pool fairy shrimp in the action area and 5.4 percent of critical habitat for the longhorn fairy shrimp in the action area.

Critical habitat for the vernal pool fairy shrimp and longhorn fairy shrimp is essential for the species' conservation and recovery, because it is needed to maintain the current geographic and ecological distribution of the species and maintain connectivity between the species' habitat north and south of the action area.

San Joaquin Kit Fox

The CNDDB currently lists a total of 959 San Joaquin kit fox occurrences, and approximately 9 percent of these occurrences have been recorded from San Luis Obispo County. In the action area, San Joaquin kit fox numbers are strongest in the southeastern part of the County near the Carrizo Plain. The species is also known from the Cuyama Valley, the northeast corner of the County, as well as areas around Camp Roberts and the City of Paso Robles. In much of the action area outside of the Carrizo Plain, kit fox abundance appears to be below detection levels (Moonjian 2007). Although there is a lack of specific data on current kit fox abundance, individual surveys suggest that kit fox abundance has declined range-wide since the estimate of 7,000 was given in 1975 (Morrell 1975, Service 1983, Bean and White 2000, Smith *et al*. 2006, Moonjian 2007, Service 2010b).

The results of recent surveys (as reported in Service 2011a) in the northern Carrizo Plain showed kit fox densities at 1 kit fox per 1 to 2 square miles; however, this was not interpreted as the homerange size of the individuals. Kit fox homeranges have been documented between 1 and 12 square miles and can overlap considerably. Given the threats to the species and habitat conditions in the action area, we expect kit fox homeranges in the action area to be moderately

sized (6 square miles, 3,840 acres). As habitat becomes more degraded, individuals likely will need larger homeranges to find sufficient breeding, feeding, and sheltering resources.

Threats to the species have reduced the quality of kit fox habitat and the amount of resources available to the species in the action area. San Joaquin kit foxes in the action area are subject to direct and indirect effects of human activities including roads and vehicles, rodenticide, and habitat loss and fragmentation due to urbanization and agriculture expansion. The species is also affected by increased numbers of native and non-native predators and competitors (e.g., coyote (*Canis latrans*), red fox (*Vulpes vulpes*)). Most recently, development of two large-scale solar facilities is underway and is expected to destroy 5,227 acres of San Joaquin kit fox habitat primarily in the Carrizo Plain. This would include loss of known dens, and would constrict a major habitat corridor between kit fox habitats in the northern and southern parts of the action area. As part of the solar facility projects, the project proponents would preserve more than 20,000 acres including restoration of large areas currently used for agriculture and unsuitable for kit fox. This restoration and preservation is expected to result in a net gain in suitable habitat for the species.

Giant Kangaroo Rat

Currently, the giant kangaroo rat is found on less than 5 percent of its historical range. In the action area, we consider the species extant in and around the San Juan Creek Valley, the Carrizo Plain, and the Cuyama Valley along the southeastern Santa Barbara-San Luis Obispo County line. The populations in the Carrizo Plain are the most studied and the best understood. The Carrizo populations showed substantial increases between 2001 and 2006 (Bidlack 2007) and are currently considered stable (Service 2010c). With the exception of agricultural and developed areas, we expect the giant kangaroo rat and the San Joaquin kit fox to occupy a similar range in the action area, because the two species are ecologically linked.

Urbanization and intensive agriculture have replaced large amounts of native habitat in the action area. This conversion has reduced the amount of suitable habitat for the giant kangaroo rat and has contributed to decline of the species through displacement, direct and indirect mortality, barriers to movement, and reduction of food resources. The giant kangaroo rat is also affected by livestock grazing, although the species may be compatible with low intensity grazing that preserves ecosystem functions needed by the giant kangaroo rat (i.e., intact soil, seed producing forbs and grasses). Overgrazing can accelerate erosion and alter floristic communities, degrading giant kangaroo rat habitat. Trash, food scraps, and increased small rodent populations around human development can subsidize populations of coyotes and non-native red foxes which could prey on the giant kangaroo rat. Poisoning for rodent control also directly contributes to mortality and decline of the species.

Most recently, development of two large-scale solar facilities is underway and is expected to cover 5,227 acres primarily in the Carrizo Plain. This would include destruction of 1,631 acres of known giant kangaroo habitat and would constrict a major habitat corridor between potential

giant kangaroo habitats in the northern and southern parts of the action area. As part of the solar facility projects, the project proponents would preserve more than 20,000 acres of land including restoration of large areas currently used for agriculture and unsuitable for kangaroo rats. This restoration/preservation is expected to result in a net gain in suitable habitat for the species.

Blunt-nosed Leopard Lizard

Currently, the blunt-nosed leopard lizard is found on less than 15 percent of its historical range. In the action area, urbanization and intensive agriculture have replaced large amounts of native habitat, reducing the amount of suitable habitat for the blunt-nosed leopard lizard and contributing to decline of the species through displacement, direct and indirect mortality, barriers to movement, and reduction of food resources. We consider the species extant in and around the San Juan Creek Valley, the Carrizo Plain, and the Cuyama Valley along the San Luis Obispo-Santa Barbara County line. There are many occurrence records of the species in these areas (CNDDB 2013), and with some exceptions, we expect the blunt-nosed leopard lizard and the giant kangaroo rat to occupy a similar range, because the two species are ecologically linked. We also expect the species to be present within habitat corridors between these areas.

The Carrizo Plan National Monument protects approximately 55,000 acres of blunt-nosed leopard lizard habitat in the Carrizo Plain and 1,000 acres in the Cuyama Valley. We expect the species to be present in suitable habitat throughout these areas. Portions of the Carrizo Plain have the highest recorded densities of the blunt-nosed leopard lizard (Germano and Williams 2005); however, as a whole the density of the species in this area is below the target density identified in the recovery plan (one lizard per acre (Service 2010d)). In addition, population monitoring has shown substantial declines in the Carrizo Plain population following consecutive years of very wet or very dry weather.

In the Carrizo Plain, the blunt-nosed leopard lizard has been, and continues to be, threatened by agriculture, limited commercial and residential development, off-road vehicle activity, and oil and mineral extraction. Most recently, development of two large-scale solar facilities is underway and is expected to cover 5,227 acres primarily in the Carrizo Plain (Service 2011a,b). Surveys for the blunt-nosed leopard lizard were conducted, and the species was found on very little of the habitat that would be lost to these projects; however, these projects would have direct and indirect effects on the species, destroy potentially suitable habitat, and constrict a major habitat corridor between potential blunt-nosed leopard lizard habitats in the northern and southern parts of the action area. As part of the solar facility projects, the project proponents would preserve more than 20,000 acres of land including restoration of large areas currently used for agriculture and unsuitable for blunt-nosed leopard lizards. This restoration/preservation is expected to result in a net gain in suitable habitat for the species (Service 2011a,b).

The Cuyama Valley, in extreme southeastern San Luis Obispo County, is the southernmost known occupied habitat in the species' range. Blunt-nosed leopard lizard habitat in the Cuyama Valley has been substantially reduced, degraded, and fragmented primarily by agricultural

development and to a lesser extent by roads and gravel mining. Gravel mining has occurred in the Cuyama River for decades and has likely impacted blunt-nosed leopard lizards through removal of streamside terrace habitat and direct mortality associated with mining activities. In places where native habitat has been converted to agriculture, blunt-nosed leopard lizards (when present) are found at the margin of agriculture, often in sub-optimal habitat.

We are aware of multiple records of blunt-nosed leopard lizards in Cuyama Valley. The species was observed at several locations in the 1970s, but at least one of these locations has been converted to row crops/orchards. An observation in 2003 is adjacent to a gravel mining operation, and a 2007 observation was nearby a proposed housing development. The most recent observations were made in the upper Cuyama Valley near LPNF in 2008 and 2009 (Grimes et al. 2010)(these locations are in Ventura County, just outside the action area). The species also occurs in approximately 1,000 acres of the Carrizo Plains Ecological Reserve in the west-central Cuyama Valley; although the current population status in this area is unavailable.

Livestock grazing occurs in the both the Carrizo Plain and the Cuyama Valley. Overgrazing can degrade habitat and cause adverse effects to the species; however, when managed properly, grazing is a useful method of improving or maintaining habitat for the blunt-nosed leopard lizard by thinning dense vegetation that would functionally exclude the species.

Least Bell's Vireo

Riparian habitat suitable for the least Bell's vireo has been substantially reduced rangewide, primarily by anthropogenic modification including flood control, water impoundment and diversion, urban development, agricultural conversion, and livestock grazing. These same mechanisms have affected habitat for the least Bell's vireo in the action area. That said, least Bell's vireos have been reoccupying their historical range since the time of listing and are being found in previously undocumented locations (Service 2006b); recent sightings of this subspecies have been made within San Luis Obispo County (CNDDB 2011) (along the Salinas River in Paso Robles in 2005 and 2013 and in Los Osos in fall 2009). Therefore, we anticipate that the subspecies could occur in any suitable habitat in the action over the duration of the Program. Breeding by the least Bell's vireo has not been confirmed within the action area, but there is suitable habitat available in multiple riparian reaches throughout the action area, and it is reasonable to anticipate that least Bell's vireos could breed in the action area during the term of the Program.

Morro Shoulderband Snail

According to the Recovery Plan for the Morro shoulderband snail (Service 1998b), the species was first identified in 1911 living in areas south of Cayucos. Since then its range has decreased considerably, due largely to habitat destruction and degradation. The species' current known range is the Los Osos area to just north of Morro Bay, in the coastal dune scrub habitat that provides shelter in leaf litter and on the undersides of plants, especially mock heather. Morro shoulderband snails have also been found underneath mats of iceplant. There are no recent

population estimates; however, according to CNDDB, there are 10 occurrences (1 of which is reported to have been extirpated in Los Osos) in the coastal dune habitat in Morro Bay and Los Osos. Based on recent survey efforts reported in Service (2013), we expect that Morro shoulderband snails could reach average densities of up to or exceeding 50 snails per acre in the action area.

Threats to the survival of the Morro shoulderband snail through habitat loss and degradation have been reduced considerably. Several core Morro shoulderband snail habitats essential to the recovery of the species have already been preserved. The species is still threatened by competition from the common garden snail, poisoning, and stochastic extinction; however, the main threats to the species have been greatly reduced since listing.

Critical Habitat for the Morro Shoulderband Snail

The Service designated three units (a sum of 2,566 acres) of critical habitat for the Morro shoulderband snail, and these units contain much of the known range of the species. Threats to the species' critical habitat include commercial and residential development, non-native plant and animal species (e.g., veldt grass, *Eucalyptus*, non-native snails), hikers, and equestrian use. Because the action area excludes dunes and the coastal strand, not all critical habitat for the Morro shoulderband snail would be subject to Program activities. The three critical habitat units are described below.

Unit 1: Morro Sandspit and West Pecho
Unit 1 encompasses areas managed by CDFG (Montaña de Oro State Park), and the city of Morro Bay, including the length of the sandspit and the foredune areas extending south toward Hazard Canyon. The unit consists of approximately 1,670 acres of State land and 160 acres of land owned by local government. The protection and recovery of this unit is essential to maintain the genetic diversity of the Morro shoulderband snail. It contains several significant, viable populations of Morro shoulderband snail and if suitable habitat conditions are maintained through proper management, this unit will provide for connectivity and dispersal between populations and maintenance of genetic diversity over the long-term.

Unit 2: South Los Osos
Unit 2 consists of approximately 320 ac of land on the north-facing slopes of the Irish Hills and is bounded on the north and east by residential development and agricultural fields. The area on the lower slopes of the Irish Hills, where the vegetation is composed of maritime chaparral, is considered essential to the conservation of the Morro shoulderband snail. Primary constituent elements of critical habitat for the Morro shoulderband snail exist on the lower slopes of the Broderson site. The 204-acre Morro Ecological Reserve (formerly known as the Bayview site) and the 80-acre Broderson site are the largest tracts of land in this unit. The ecological reserve is owned by CDFW and the Broderson site is under private ownership. This unit contains a sustainable, core population of Morro shoulderband snails that could be expanded with appropriate management.

Unit 3: Northeast Los Osos

Unit 3 contains 420 acres of high-quality coastal dune scrub habitat that includes the undeveloped areas between Los Osos Creek and the community of Baywood Park in northeast Los Osos. This unit supports the northernmost intact habitat for, and sustainable populations of, Morro shoulderband snail in Los Osos. Unit 3 includes privately-owned residential areas and land owned by the State and County, including the Elfin Forest Preserve and portions of Morro Bay State Park. The protection and recovery of this unit are essential to maintain the genetic variability of the species and the full range of ecological setting within which the species is found. The unit has favorable habitat conditions for the expansion and persistence of the core population, and with the reduction of threats through appropriate management, this area should support a larger Morro shoulderband snail population and contribute to the recovery of the species.

Tidewater Goby

The tidewater goby currently occupies approximately 21 localities of brackish habitat in rivers, creeks, estuaries, sloughs, etc. from Arroyo del Corral in northern San Luis Obispo County to the Santa Maria River estuary at the border with Santa Barbara County (Service 2005b). Some occupied tidewater goby habitat may exist on federally-owned land outside the scope of the Program. In waterways with sufficient surface water (e.g., Santa Maria River), tidewater gobies could be found in the action area several miles upstream of brackish habitats. The tidewater goby localities in the action area are part of either the Central Coast or Conception Recovery Units as described in the species' recovery plan (Service 2005b). They are important to the recovery of the species because they provide linkages between metapopulations of tidewater goby and help maintain genetic diversity amongst the northern, central, and southern populations, which are genetically distinct from each other.

The decline of the tidewater goby is attributed primarily to habitat loss or degradation resulting from urban, agricultural, and industrial development in and around coastal wetlands, as well as the introduction of non-native predatory fish species (most notably, centrarchid sunfish (*Lepomis* spp.) and bass (*Micropterus* spp.)). These threats continue to affect some of the populations of tidewater gobies in the action area.

Critical Habitat for the La Graciosa Thistle

All or portions of two critical habitat units for the La Graciosa thistle are within the action area. These units are at least partially located in dunes and the coastal strand and the Guadalupe Nipomo Dunes National Wildlife Refuge; therefore, portions of these units may not be subject to Program activities.

Unit 1: Callender-Guadalupe Dunes

- Covers much of the dune complex between the City of Oceano and the Santa Maria River;

- Is currently occupied and contains the physical and biological features essential to the conservation of the species;
- Is subject to disturbance by livestock grazing, groundwater withdrawals, off-highway vehicles, and oil extraction; and
- The unit is essential for the conservation and recovery of the species, because it contains the largest block of native habitat still occupied by La Graciosa thistle including three of the four remaining La Graciosa thistle populations, and it contains the northern-most populations of the species.

Unit 2: Santa Maria River-Orcutt Creek

- The portion of unit 2 in the action area includes the lower 5 miles of the Santa Maria River;
- Is currently occupied and contains the physical and biological features essential to the conservation of the species;
- Is subject to disturbance by livestock grazing, agriculture, and upstream groundwater withdrawals;
- Historically supported the largest known population of La Graciosa thistle;
- The unit is essential for the conservation and recovery of the species, because it contains the last extant population in riverine habitat and is important for maintaining connectivity between populations north and south of the Santa Maria River.

Critical Habitat for the Camatta Canyon Amole

San Luis Obispo County contains one critical habitat unit for the Camatta Canyon amole. The unit occurs near the center of the County, around 18 miles east of Santa Margarita. Approximately 25 percent of the unit (1,089 acres) is federally owned and is outside the scope of the Program; therefore, the action area contains 3,289 acres of critical habitat for the Camatta Canyon amole subject to Program activities (67 FR 65414).

Camatta Canyon Unit

- Includes 4,378 acres (74 percent of designated critical habitat) on the plateau on both sides of Highway 58 near Camatta Canyon and contains the physical and biological features essential to the subspecies' conservation;
- Supports one of two known populations and comprises thousands (at least) of individuals and the associated seek bank;
- Supports habitat for species that pollinate Camatta Canyon amole;
- Critical habitat in LPNF has received special management consideration for / protection from off-road vehicle use and livestock grazing. Other parts of the unit may require additional special management consideration for, or protection from, off-road vehicle use, road construction and maintenance, other ground disturbing activities, livestock grazing, and herbivory; and

- This unit is essential for the conservation and recovery of the species, because it contains much of the known range of the species, as well as intervening, seemingly suitable habitat that may provide connectivity between the two occurrences in the unit.

EFFECTS OF THE ACTION

Beneficial Effects

The NRCS' Permit Coordination Program would create a more efficient permitting process to facilitate voluntary restoration in San Luis Obispo County. As a non-regulatory Federal agency, the NRCS can develop unique relationships with landowners and pursue mutual conservation goals that may have otherwise been difficult or impossible to achieve. We expect that through the Program, participants will learn about listed species that may be on their property, those species' needs and contributions to the landowner's property, and the necessary measures to ensure compatibility between listed species and activities on the property. In addition, previously-unknown occurrences of listed plant and animal species may be identified and protected.

We expect the Program practices to contribute long-term, net benefits to listed plant and wildlife species addressed in this biological opinion and to native species in general. The practices emphasize stabilizing and restoring degraded areas, preventing sediment and other contaminants from entering waterways, removing non-native plant species, and improving habitat connectivity. We expect the Program to improve water quality and native aquatic, riparian, and upland habitats by controlling erosion, reducing sedimentation and other contaminants, removing invasive plant species, providing alternate water sources for livestock away from riparian areas, and restoring the ecological integrity of wildlife habitats. Absent the protective measures and practices proposed by the NRCS, areas that are eroded, infested with non-native invasive species, or provide low-quality breeding habitat within the watersheds of San Luis Obispo County would continue to impair the amount of available breeding, foraging, and dispersal habitat for listed and other native species.

Stressors Addressed by the Program

Erosion and livestock activity

Erosion and livestock activity can undermine the structural integrity of plant and wildlife habitat by disturbing soil, compromising the integrity of stream banks, removing vegetation, and causing excessive nutrient and sediment inputs into waterways. Degraded riparian areas do not provide optimal habitat for species that rely on riparian or aquatic habitat for feeding, breeding, and/or sheltering. High intensity grazing also disturbs upland areas by compacting or loosening soil, accelerating erosion along livestock paths, and denuding areas of vegetation. These conditions can worsen if left unattended and cause uncontrolled headcutting, bank failure, decreased water quality, and increased water temperatures. These effects can lead to reduced breeding, feeding,

and sheltering opportunities by precluding use of aquatic, riparian, or upland areas by native species, ultimately causing departure or death.

Aquatic contamination
Excessive sediment, chemical, and nutrient inputs stemming from agriculture tailwater and livestock activities in aquatic systems can, at a minimum, create degraded ecosystem conditions and reduce the fitness of affected species. At worst, contaminants can cause the loss of any life stage of aquatic species by changing vegetation communities and density, altering or burying spawning substrate, smothering egg masses, poisoning waterways, and killing or altering prey species.

Invasive species
Non-native, invasive plant species can fundamentally change aquatic and riparian habitats. Invasive species tend to displace native vegetation and provide a habitat structure that is unsuitable for native species, especially those with specific habitat requirements. Some invasive species can choke waterways, hindering movement of aquatic species, eliminating breeding and foraging sites, and increasing flood probability.

Habitat fragmentation
Habitat fragmentation inhibits dispersal to new habitat, completion of migratory cycles, metapopulation dynamics, and gene exchange between sub-populations. Fragmented populations tend to be less resilient to change and stressors, and more prone to extirpation than connected populations. Water diversions, stream crossings, and other anthropogenic structures, along with erosion upstream and downstream of these structures can cause habitat fragmentation for fish species and prevent breeding activity for migratory species. Vegetation loss as a result of excessive erosion can kill native plants, degrade critical habitat, and fragment riparian corridors. Loss of ponds and upland habitat due to agricultural activities or sedimentation has important consequences for amphibians as the distance between aquatic habitats increases and breeding sites and refugia are lost.

Adverse Effects on Listed Species

We expect Program implementation to affect listed species as follows:

1. Some individual animals may be indirectly and/or directly affected by project activities to the point of disturbance, injury, or death.
2. Adverse effects to individuals may temporarily impact local populations or ecological communities that support the affected individuals.
3. On rare occasions a project may affect a species' habitat to the extent that a local population or sub-population experiences a temporary reduction in habitat functionality. For example, maintenance of a stock pond removes existing emergent vegetation and prey species that support various life stages of the California red-legged frog and California tiger salamander. In this circumstance, we would expect emergent vegetation

and prey species to re-colonize the stock pond, ultimately providing habitat that is equal to or improved from what was present before maintenance.

4. Some Program practices that we expect to contribute long-term benefits to erosion control, water quality, and habitat connectivity in the action area may indirectly cause adverse effects on listed species by creating feeding, breeding, and/or sheltering habitat (e.g., filter strips, stock ponds, sediment basins) for listed species or their prey species adjacent to intensive land use. Species attracted to this habitat have an increased potential for interaction with vehicles, agriculture machinery, livestock, and other human pursuits.
5. We do not expect the adverse effects caused by Program activities to have consequences for the larger geographic range of subject species occurring outside the action area (e.g., California red-legged frog, least Bell's vireo).

The NRCS proposes to implement extensive measures to avoid or minimize adverse effects to listed species (see Description of the Proposed Action of this biological opinion and Table 3 of the BA). These measures will be incorporated, as appropriate, into design and implementation phases of all projects and include, but are not limited to clearly defining and marking the limits of a project area, limiting the area that can be affected by a single project, sensitive habitat avoidance, seasonal work restrictions, surveying for listed species, relocating certain listed species (i.e., California red-legged frogs, California tiger salamanders, and tidewater gobies), limiting work to daylight hours, and environmental briefing sessions with project personnel. The proposed measures should be effective in reducing or avoiding injury or mortality of listed species during Program implementation; however, some individuals may be incidentally disturbed, injured, or killed.

We identify specific potential impact mechanisms and associated effects in the following sections, including those impacts associated with vehicles and construction equipment; loss or degradation of habitat; relocation of listed species; surveying, monitoring, and foot traffic; and removal of invasive vegetation. We anticipate potential effects in light of the extensive avoidance and minimization measures proposed by the NRCS that would be implemented as part of the Program.

Vehicles and Construction Equipment

Vehicles and construction equipment (collectively "vehicles") associated with project activities could directly and indirectly affect listed species within the action area. Moving vehicles could strike or crush listed species causing injury or death, and elevated levels of traffic associated with a project's activities could increase the likelihood for animals to be struck. Vehicles may emit vibrations, loud noise, or noxious exhaust that temporarily renders an area unsuitable for listed species. Vehicles may also disturb or compact soil, damage vegetation, or otherwise disturb habitat and temporarily render that habitat unsuitable for listed species.

California red-legged frogs, California tiger salamanders, San Joaquin kit foxes, giant kangaroo rats, and blunt-nosed leopard lizards may be driven from a project area by vibration, loud noise, noxious exhaust, or vehicle presence. Leaving familiar territory and seeking alternate habitat exposes an individual to increased energy expenditure, intraspecific competition or confrontation, increased predation, and generally may interrupt normal breeding, feeding, and sheltering behavior leading to an increased chance of injury or death.

Vehicles may injure or crush California red-legged frogs, California tiger salamanders, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit foxes, giant kangaroo rats, blunt-nosed leopard lizards, or Morro shoulderband snails if these species occur on the ground surface in a project area. The NRCS' proposal to avoid nighttime construction will minimize the risk of this occurring for most species. However, California red-legged frogs, California tiger salamanders, San Joaquin kits foxes, giant kangaroo rats, and blunt-nosed leopard lizards are known to use or dig burrows or dens and could still be crushed, entrapped, or otherwise injured or killed if vehicles collapse dens or burrows during daylight hours. The NRCS' proposal to employ a Service-approved surveyor/monitor during activities that could affect listed species would minimize the chance of vehicles impacting individuals of these species.

We do not expect project vehicles to directly affect the least Bell's vireo. The NRCS proposes seasonal work restrictions, and we do not expect this migratory species to be in the action area during project activities. However, vireos may experience indirect adverse effects when returning to habitat that was disturbed during the non-breeding season.

San Joaquin kit foxes are known to forage in agricultural fields, and filter strips or other Program practices may enhance habitat for prey species of the San Joaquin kit fox. Kit foxes trying to access this prey or water sources created by Program practices could be adversely affected by vehicles.

Vehicles operating in aquatic habitat could spill fuel or chemicals into the water column poisoning the aquatic habitat, while excessive sedimentation could smother eggs or burrows and suffocate individual California red-legged frogs, California tiger salamanders, fairy shrimp, and/or tidewater gobies. Impacts to tidewater goby eggs, amphibian eggs, or tadpoles would be most severe if project activities were conducted during breeding seasons, in breeding ponds, or in pools in streams. The NRCS proposes seasonal work restrictions (i.e., working during the dry season) that will generally avoid impacts to breeding amphibians and fairy shrimp; however, juvenile or adult California red-legged frogs and California tiger salamanders, and any lifestage of fairy shrimp could be affected if work occurs in ponded areas that persist during the dry season. Any life stage of the tidewater goby could be affected, because the species can breed year-round. To further minimize or avoid the effects of vehicles on aquatic habitat the NRCS would restrict the conditions under which vehicles and specific types of vehicles are allowed to work in water and would minimize the length of time vehicles may be in water (see Table 3 of the BA). The NRCS would also require that vehicles be checked for leaks, and that spill packs be carried on construction vehicles.

The NRCS would avoid effects to vernal pools, which will reduce adverse effects to California red-legged frogs, California tiger salamanders, vernal pool fairy shrimp, and longhorn fairy shrimp. However, amphibians and fairy shrimp have been documented to successfully breed in artificially ponded water sources and will likely use many of the stock ponds installed or maintained under the Program. Therefore, installing ponded water sources could benefit these species by augmenting available habitat, but wildlife that use the stock ponds may be directly adversely affected during maintenance of the ponds or may be indirectly affected as maintenance causes temporary habitat disturbance. California red-legged frogs, California tiger salamanders, and/or fairy shrimp could be injured or killed during sediment removal, and those taking refuge in rodent burrows could be buried, injured, or killed during earthmoving activities and by moving vehicles.

Ground vibration and noise are thought to have some effect on San Joaquin kit foxes and a substantial effect on giant kangaroo rats. Kangaroo rats' hearing is highly developed and a large portion of the brain is devoted to auditory input (Lay 1993). Kangaroo rats are known to communicate with each other by foot drumming (Randall and Lewis 1997), which may serve the function of a warning call or of allowing neighbors to recognize each other. Interference from ambient noise produced by Program activities may interfere with communication among kangaroo rats, causing them to be unusually susceptible to predators and predation (Service 2004) or otherwise disrupt normal feeding, breeding, and sheltering activities. The NRCS proposal to work during daylight hours, and establish buffers around kit fox dens and giant kangaroo rat precincts and prohibit construction equipment within those buffers, would reduce the adverse effects of project-generated noise.

To further reduce the likelihood of impacts from vehicles, the NRCS has proposed to avoid nighttime construction, minimize off-road vehicle travel, and educate workers regarding the presence of the listed species and the importance of remaining within authorized work areas. Such measures should be effective in avoiding or minimizing impacts to species and habitat.

Loss or Degradation of Habitat

Loss or degradation of habitat could result from any of the subject practices and could affect upland, riparian, and aquatic habitat. Habitat loss and degradation would be either incidental to the purpose of a practice (e.g., vehicles, foot traffic, livestock management, sedimentation or chemical contamination) or could be related to the purpose of a practice (e.g., pond maintenance, vegetation trimming). Temporary habitat loss or degradation may affect highly mobile species with large areas of contiguous habitat (e.g., least Bell's vireo) to a lesser extent than species with fragmented habitat (e.g., California tiger salamander, blunt-nosed leopard lizard) or those that cannot easily seek alternate habitat (e.g., both fairy shrimp species); nevertheless, we expect that all of the listed species in this biological opinion may experience indirect adverse effects from loss or degradation of suitable habitat caused by Program activities.

Creation of new ponds will attract livestock and promote intense land use around the pond. Livestock using ponds could disturb, injure, or crush California red-legged frog or California tiger salamander individuals or egg masses near the periphery of the pond or adults and juveniles dispersing from the pond. Livestock could adversely affect fairy shrimp by causing sedimentation; and livestock urine and droppings could degrade water quality, change the nutrient balance in the water, and facilitate rapid algal and emergent vegetation growth. Listed species are likely to be adversely affected during "operation" and maintenance of a pond, but the creation of new aquatic habitat and persistence of existing adequate aquatic habitat will benefit the affected listed species and may offset adverse effects to individuals. The NRCS' proposals to (1) work in ponds only when they are dry or when sheet flow is lowest, (2) survey for listed species and relocate as necessary, (3) limit projects to the smallest area necessary, and (4) avoid rodent burrows to the maximum extent possible, should minimize the chance of injury or death of listed species.

Practices that require earth moving, excavation, or other disturbance in or near streams or ponds may degrade habitat for the California red-legged frog, California tiger salamander, both fairy shrimp species, and tidewater goby. Sediment and contaminants would affect the adjacent aquatic environment and could affect other habitat downstream of the sediment/contaminant source. The direct placement of material or the incidental runoff of sediments generated by a project, into aquatic habitats could result in the loss of wetlands and other aquatic habitat through filling or degradation of water quality. Temporary increased sedimentation could smother goby nests and eggs, and an accidental release of toxic substances to streams could injure or kill any life stage of California red-legged frog, California tiger salamander, or tidewater goby. The NRCS' proposals to (1) work in ponds only when they are dry or when sheet flow is lowest, (2) survey for listed species and relocate as necessary, (3) limit projects to the smallest area necessary, and (4) implement measures to avoid contamination of aquatic habitat would minimize disturbance to aquatic habitat and minimize the chance of injury or death of listed species.

Upland habitat for the California red-legged frog and California tiger salamander may be temporarily lost if excavated sediment is spread over nearby rodent burrows. California red-legged frogs, California tiger salamanders, and other fossorial species may be crushed, entombed, or otherwise adversely affected if sediment is spread over occupied rodent burrows. To reduce this threat, the NRCS proposes to spread sediment on burrow-free areas to the greatest extent practicable.

Practices that affect upland habitat also could impact the San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, and Morro shoulderband snail. Grading, excavation, trenching, livestock management that intensifies livestock use of certain areas, etc. could cause habitat degradation and destroy or degrade breeding, feeding, or sheltering habitat for these species and increase the likelihood of injury or death. Upland habitat disturbance could also destroy or degrade sheltering and foraging habitat (upland vegetation, rodent burrows) for California red-legged frogs and California tiger salamanders. Although the NRCS proposes to minimize the

size of projects and restrict project activities outside defined project boundaries, projects that occur in these species' habitats are likely to cause some temporary or permanent habitat disturbance.

Habitat for the least Bell's vireo could be lost or degraded if riparian vegetation is damaged, removed, or buried. This species is known to reuse the same habitat from year to year, and we consider the loss of habitat within a known territory an adverse effect. We do expect some habitat for these species to be removed under the Program (e.g., Debris Removal and Vegetation Management). Although the amount of habitat removed during a single project would be small and may not comprise an entire territory, any change in the composition of a territory structure could make the area less appealing to returning individuals. We recognize that these species breed in an inherently dynamic ecosystem and small changes to habitat structure within an existing territory happen naturally. We also recognize that the species is uncommon in the action area. Therefore, we expect the effects of habitat loss under the Program to be temporary and minimal, and we expect the restoration efforts conducted under the Program to offset temporary impacts.

Loss or degradation of habitat is likely to cause some or all affected individuals to seek alternate habitat. Leaving familiar territory can expose individuals to inclement microclimates or increased predation risk. Individuals moving into adjacent territories can concentrate conspecifics and strain available feeding, breeding, and sheltering resources leading to increased energy expenditure, competition, intraspecific aggression, and likelihood of injury or death. Given the relatively small size of the proposed projects, and the NRCS' seasonal work restrictions to avoid listed species' active seasons to the extent practicable, we expect few individuals to be displaced by Program activities.

In general, we expect the effects of habitat loss to be temporary in nature, and the avoidance and minimization measures proposed by the NRCS (e.g., pre-construction surveys, on-site monitoring by a Service-approved individual, limiting project size) would effectively minimize the potential for adverse effects to listed species. The NRCS would implement best management and erosion control practices that would greatly reduce the potential for sedimentation or contamination of the watershed as a result of the Program. Careful placement and construction of embankments or other structures that would reduce or eliminate sediment run-off and bank erosion would provide long-term benefits to riparian habitat and any listed aquatic species in the project areas. Many stream-side or pond-side projects will result in a net improvement of habitat conditions through such measures as restoration or erosion control, and will thereby provide a long-term benefit to listed species and their habitats. Restoration of project sites and removal of invasive, non-native vegetation would improve habitat and minimize possible long-term effects of project activities on listed species. Many of the practices would ultimately improve water quality, decrease sedimentation, and direct livestock away from sensitive habitat; this will improve the quality of those habitats and benefit listed species, and native species in general, in the action area.

Relocation of Listed Species from Project Sites

The NRCS proposes to capture and relocate Morro shoulderband snails from project sites where project activities could injure or kill them. Many of the proposed conservation practices would impact native or non-native upland habitat and could require relocation of Morro shoulderband snails, if the practices occur in habitat occupied by the species. A Service-approved individual would relocate snails in harm's way to suitable habitat outside and as close as possible to the area from which the individual was removed. If suitable habitat does not occur adjacent to the project area, snails may be relocated to an off-site location approved by the Service. If successfully implemented, such relocation efforts would substantially reduce the number of Morro shoulderband snails that could be injured or killed by project activities. Even so, individuals could be injured or killed during relocation efforts and individuals relocated to unfamiliar habitat could be subject to desiccation, increased predation and/or competition, or may otherwise be unable to breed, feed, and shelter normally. The NRCS' proposal to employ Service-approved individuals to conduct surveys, capture, and relocation would minimize the risk of this occurring. The Morro shoulderband snail occurs in a restricted range in the action area, and we expect that few (if any) projects proposed under the Program would occur in occupied Morro shoulderband snail habitat; therefore, we expect the need to relocate individuals of this species would be rare.

Any ponded or riverine water source in the action area will likely support one or more of these species: California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, and tidewater goby. California red-legged frogs are the most widespread of these species within the action area, and we expect this species to be encountered frequently relative to the other four. However, we expect the California tiger salamander, both fairy shrimp species, and tidewater goby to be locally abundant in or near certain aquatic habitat within the action area.

The NRCS proposes to capture and relocate California red-legged frogs, California tiger salamanders, and tidewater gobies from project sites where construction activities could injure or kill them or where surface flows would be diverted prior to the onset of ground-disturbing activities. Many Program practices involve activities in or near aquatic habitat that have the potential to adversely affect listed aquatic obligates. To minimize the chance of injury or death of listed species, the NRCS would prohibit work in flowing or ponded water and would require dewatering of such areas prior to ground disturbance. The NRCS estimates that 5 to 6 stream practices per year would require dewatering and may require capture and relocation of listed species. If successfully implemented, such relocation efforts would substantially reduce the number of California red-legged frogs, California tiger salamanders, and tidewater gobies that could be injured or killed (e.g., buried by fill, crushed by equipment, desiccated during dewatering, etc.) by project activities. If individuals of these species are relocated to inappropriate habitat, the individuals could be subject to desiccation, increased predation, or otherwise be unable to breed, feed, and shelter normally. The NRCS' proposal to identify

suitable relocation habitat prior to project implementation and to employ Service-approved individuals for capture and relocation activities should maximize the chance of successful relocations.

The NRCS' proposed seasonal work restrictions should ensure that projects do not occur during amphibian breeding season. This should eliminate the difficulty and potential mortality associated with finding, capturing, and relocating egg masses and tadpoles. We expect mortality associated with capture and relocation of juvenile or adult amphibians to be rare, and the NRCS' proposal to employ Service-approved individuals to conduct these activities will minimize the risk of injury or mortality. In addition, the California tiger salamander and tidewater goby occur in specific and relatively uncommon habitats in the action area. Therefore, we expect the need to relocate these species would be rare.

Tidewater gobies can breed year round, can occur in extremely high densities, and due to their small size, can be difficult to locate and capture. We expect that some tidewater gobies will evade detection and not be captured and relocated and will be crushed, buried, dehydrated, or otherwise killed during project activities; however, we also expect the proportion of tidewater gobies killed or injured to be relatively low. The NRCS' proposal to employ Service-approved individuals to conduct capture and relocation efforts will minimize the risk of injury or mortality. Because tidewater gobies breed year round, local populations can exhibit large increases within a single year. Given this, the temporary nature of the disturbance expected due to Program activities, and the NRCS' EPMs, we expect any tidewater goby population affected by the Program to quickly recover from those effects.

Program personnel working at multiple locations (inside or outside of the action area) and with different species could transmit diseases (e.g., chytridiomycosis, ranaviral disease, etc.) by introducing contaminated equipment into aquatic habitats. It is possible that chytrid fungus may exacerbate the effects of other diseases on amphibians or increase the sensitivity of individuals to environmental changes (e.g., water pH) that reduce normal immune response capabilities (Bosch et al. 2001). However, the NRCS plans to implement the "Declining Amphibian Populations Task Force Fieldwork Code of Practice" when working near aquatic habitat. Implementing these procedures during activities in aquatic habitat will likely prevent the transfer of diseases via contaminated equipment or clothing.

Surveys, Monitoring, Foot Traffic

Personnel associated with the Program will be involved in surveys for listed species, monitoring project activities, and construction activities. Personnel may cause adverse effects to any of the listed species in this biological opinion through human presence, inadequate surveys or monitoring, and foot traffic.

The NRCS proposes to conduct reconnaissance-level surveys followed by pre-construction surveys. Reconnaissance-level surveys are preliminary site assessments conducted by trained

NRCS or RCD staff to determine if potential habitat for listed plant or animal species is present within the project area. If suitable habitat is identified within the project area during reconnaissance-level surveys, the NRCS will either assume the presence of listed species or a Service-approved individual will conduct surveys prior to project activities to determine presence or absence of listed species. If listed plant or animal species are found in the project area, the Service-approved individual will also monitor construction activities to help avoid or reduce effects to any listed species that may be present. Inadequate surveys and monitoring, or improperly trained personnel could incorrectly assess listed species habitat or fail to identify listed species leading to adverse effects during project implementation. The NRCS proposal to adequately train all NRCS staff conducting reconnaissance-level surveys should ensure that any potential or questionable habitat is adequately evaluated and surveyed. The NRCS' proposal to employ Service-approved individuals to conduct pre-construction surveys and monitoring should minimize the risk of incorrect identification and inadequate monitoring.

Foot traffic from workers associated with biological surveys, monitoring, and/or construction activities could injure or kill listed species in the project area. Project personnel could also injure or kill listed species if the personnel travel outside the limits of a project area. Listed species in various life stages could be affected by trampling while the project sites are being accessed. California red-legged frogs, California tiger salamanders, tidewater gobies, giant kangaroo rats, blunt-nosed leopard lizards, and Morro shoulderband snails could be injured, killed, or entombed if personnel step on individuals or collapse burrows containing any of these species. Careless workers could also release toxic materials, conduct activities outside of designated areas, or leave garbage that would attract predators of listed species. The NRCS' proposals to delineate and mark work areas, minimize work areas to the smallest area necessary, conduct personnel education sessions, and employ Service-approved monitors will help minimize the potential for these effects to occur. Care will be taken by all NRCS staff to ensure that listed species or their habitat features (e.g., burrows, refugia, etc.) are not crushed or disturbed during survey efforts.

Upon locating an occupied San Joaquin kit fox den, the NRCS proposes to reduce the likelihood of impacts to kit fox within a project area by monitoring an active den until no activity is observed for three consecutive days, after which the den may be closed to discourage kit fox use of the den during project activities. Although this method would likely prevent direct impacts to individual kit foxes, closing a den may require individuals to expend extra energy constructing alternate dens or searching for otherwise suitable habitat. If a kit fox leaves familiar territory due to human presence and project activities, the individual may be exposed to inclement weather or increased predation risk. Individuals moving into adjacent territories can concentrate conspecifics and strain available feeding, breeding, and sheltering resources leading to increased energy expenditure, competition, intraspecific aggression, and increased chance of injury or death.

We expect that any of the listed species addressed in this biological opinion, even if they are not at risk of injury, may flee the immediate project area due to human presence and seek alternate habitat. Leaving familiar territory can expose individuals to inclement microclimates or

increased predation risk. Individuals moving into adjacent territories can concentrate conspecifics and strain available feeding, breeding, and sheltering resources leading to increased energy expenditure, competition, intraspecific aggression, and increased chance of injury or death.

We do not expect the least Bell's vireo to be affected by surveys, monitoring, or foot traffic. Due to the NRCS' proposed seasonal work restrictions, we do not expect Program activities to occur in suitable habitat for this migratory species during the breeding season. In addition, the low impact nature of surveys, monitoring, and foot traffic should prevent indirect effects to this species due to habitat disturbance.

To reduce the likelihood of impacts from personnel activity, the NRCS has proposed to educate workers regarding the presence of listed species, the importance of keeping work sites clear of trash, and remaining within authorized work areas. Such education programs should be effective in minimizing the loss and degradation of habitat, and/or the loss of listed species. Further, as stated above, the NRCS proposes to capture and relocate out of harm's way individuals of certain species if found within a project site. This should reduce the likelihood of adverse effects on listed species as a result project-related personnel activity.

Removal of Invasive Vegetation

The NRCS proposes to remove invasive plant species from creeks as part of Restoration and Management of Sensitive Habitats. The removal of invasive plants from the action area will generally benefit listed species, because these plants can reduce the abundance and diversity of native vegetation, replace open water habitat with dense vegetation, etc., and thereby degrade the overall quality of the habitat upon which native species depend. The increased presence of native vegetation may promote the diversity and abundance of invertebrates and small mammal species, thereby improving prey availability for native species such as the California red-legged frog and San Joaquin kit fox.

The actual removal of exotic vegetation would involve hand-removal of plants and treating discrete areas with herbicide. Morro shoulderband snails are known to occur in some non-native plant habitat in fairly high densities, and removal of these plants may temporarily decrease feeding, breeding, and sheltering habitat until native habitat is restored. In addition, California red-legged frogs, California tiger salamanders, Morro shoulderband snails, or tidewater gobies could be injured or killed by vehicles, worker foot traffic, or chemical contamination (also addressed in previous sub-sections) involved in these activities. Burial, trampling, or crushing of adjacent native vegetation from equipment or foot traffic in riparian areas could degrade existing habitat (also addressed in previous sub-sections). To reduce the potential for adverse effects to listed aquatic species, the NRCS will use an herbicide that is safe to use in or near aquatic habitats and will not use herbicides when wind exceeds 5 miles per hour or when rain is forecasted within 96 hours.

We do not expect invasive plant removal to directly affect the least Bell's vireo. The NRCS proposes seasonal work restrictions, and we do not expect this migratory species to be in the action area during project activities. However, the least Bell's vireo has been documented to use invasive plant species as part of territories. Least Bell's vireos may experience indirect adverse effects when returning to habitat that was altered/disturbed during the non-breeding season. Substantial alteration of a territory may cause certain individuals to seek alternate habitat. Leaving familiar territory can expose individuals to inclement microclimates or increased predation risk. Individuals moving into adjacent territories can concentrate conspecifics and strain available feeding, breeding, and sheltering resources leading to increased energy expenditure, competition, and intraspecific aggression. The NRCS' proposal to limit the size of project areas, along with the expected recovery of native species, should reduce adverse effects associated with non-native plant removal. In addition, we recognize that this species breeds in an inherently dynamic ecosystem and small changes to habitat structure within an existing territory happen naturally. Therefore, we expect invasive plant removal to cause very rare impacts to the least Bell's vireo and have long-term benefits for the species.

The NRCS proposes to limit the size of a project's impact area which should reduce adverse effects from habitat alteration. As part of sensitive habitat management, the NRCS also proposes to restrict livestock access to waterbodies and riparian areas. The absence of livestock may offset impacts incurred during invasive plant removal and will improve water quality, reduce erosion, and allow increased riparian plant growth.

Adverse Effects to Critical Habitat

California Red-Legged Frog

The action area contains all or portions of 4 critical habitat units (approximately 180,240 acres) for the California red-legged frog; one unit is partially in Kern County (unit SLO-1), a large percentage of two are in LPNF (SLO-3, SLO-4), and the entirety of the fourth is in the action area (SLO-2). The units are degraded by a variety of human activities including agriculture, grazing, possible chemical applications, fairly limited development, and roads and highways. California red-legged frog critical habitat contains elements (PCEs) that are essential for the conservation of the species, described briefly as low-gradient fresh water breeding habitat, non-breeding aquatic and riparian habitat, and upland habitat. California red-legged frog critical habitat serves the following conservation functions:

1. Provides sufficient aquatic habitat of sufficient hydroperiod for California red-legged frogs to complete breeding, as well as egg and tadpole development and metamorphosis so that juveniles can become capable of surviving in upland habitat;
2. Shallow water features or other damp, shaded habitat (including under riparian vegetation) unsuitable for breeding but that provide refugia to maintain moisture and avoid heat and solar exposure; and
3. Provides food and shelter sites, supports normal functions of aquatic habitat, and includes dispersal corridors between breeding and non-breeding aquatic habitat.

Program activities would occur primarily in previously disturbed habitat that does not contain the PCEs of critical habitat for the California red-legged frog. However, critical habitat units for California red-legged frogs contain substantial agriculture, grazing, and upland habitat (i.e., typical components of areas subject to Program activities); and we expect Program activities to occasionally occur in functional California red-legged frog critical habitat over the course of the Program.

Most practices that could adversely affect the PCEs of critical habitat for the California red-legged frog would cause temporary ground disturbance (e.g., trenching) or decrease in water quality (e.g., stream habitat improvement and management) from construction equipment, vehicles, or foot traffic. We expect temporarily disturbed habitat to recover through natural recovery or active restoration by the NRCS. We also expect the projects implemented under the proposed Program within California red-legged frog critical habitat units to ultimately improve the overall quality of habitat in these areas.

Some practices (e.g., pond improvements), if conducted in California red-legged frog critical habitat, would likely adversely affect upland critical habitat through ground disturbance and would likely affect aquatic habitat as sediment is removed; however, such practices may also create/improve other PCEs (breeding or non-breeding aquatic habitat) and benefit the species. Given the seasonal work restrictions and small project footprints proposed by the NRCS, we do not expect these practices to fragment dispersal habitat or disrupt ponded habitat during the breeding season. We expect adverse effects from these practices to be temporary as the habitat recovers through natural recovery or active restoration by the NRCS. In addition, the NRCS proposes pre-planning surveys that will further minimize impacts to critical habitat and reduce the extent of effects to critical habitat. These practices should maintain or improve the quality of critical habitat over the course of the Program.

Other practices (e.g., grade stabilization, pipeline), while certain to cause ground disturbance, may not affect PCEs under every application. For example, installing a pipeline could cause ground disturbance in a critical habitat unit; however, if no food or shelter sites are affected and dispersal habitat is maintained by filling all open trenches, then the PCEs may not be damaged. We expect impacts from these practices to be temporary as the habitat recovers through natural recovery or active restoration by the NRCS. The NRCS proposes measures, such as pre-planning surveys and seasonal work restrictions, to minimize impacts to critical habitat and these measures should reduce the extent of disturbance and adverse effects to critical habitat.

The irrigation system and tailwater recovery practice could have longer term or permanent impacts to a critical habitat unit. This practice could replace critical habitat with ponded habitat of insufficient hydroperiod to support amphibian breeding and would contain potential threats (e.g., pumps, poor water quality) of injury or death. Construction of a tailwater recovery basin would remove a maximum of 0.5 acre of critical habitat; however, indirect effects of the practice as an attractive nuisance could extend beyond the basin footprint and degrade the quality of a critical habitat unit. That said, the intent of this practice is to reduce contaminant runoff from

agricultural fields, and any adverse effects of this practice may be offset by improvements to water quality in critical habitat downstream of irrigation system and tailwater recovery practices.

Cross-fencing would be installed to move livestock away from riparian or overgrazed areas and concentrate activity around a landowner-provided water source. Managing livestock to prevent overgrazing and associated erosion issues would maintain or improve the quality of a critical habitat unit; however, concentrating livestock around a pond in California red-legged frog critical habitat could cause extensive ground disturbance, reduce water quality, and degrade critical habitat and PCEs in that area. We expect adverse effects from cross-fencing to occur infrequently as the NRCS proposes to install two cross-fences per year in the entire action area (Table 1).

Table 1. Maximum disturbance and estimated number of practices. These figures were revised from Tables 6a and 6b of the BA (M. Lindquist, NRCS, pers. comm. 2013).

Stream Practice	**Practices/ year**	**Practices/ 5 years**	**Disturbance (acres)**	**Disturbance/ year**	**Disturbance/ 5 years**
Channel Stabilization	1	5	2	2	10
Grade Stabilization Structure	3	15	1.5	4.5	22.5
Debris Removal & Vegetation Management	4	20	0.05	0.2	1
Critical Area Planting - on stream bank	5	25	4	20	100
Pipeline (crossing a stream)	2	10	0.1	0.2	1
Pond Improvements	2	10	1.5	3	15
Restoration & Management of Sensitive Habitats					
Invasives removal	4	20	5	20	100
Stream Bank Protection	2	10	5	10	50
Stream Crossing	2	10	0.1	0.2	1
Stream Habitat Improvement & Management					
Barrier removal	1	5	0.5	0.5	2.5
Install habitat features	1	5	0.2	0.2	1
Plant riparian vegetation	2	10	1	2	10
Structure for Water Control/Culvert	3	15	0.25	0.75	3.75
Totals	**32**	**160**	**--**	**64**	**318**
Upland Practice	**Practices/ year**	**Practices/ 5 years**	**Disturbance (acres)**	**Disturbance/ year**	**Disturbance/ 5 years**
Access Road Improvements	3	15	15	45	225
Critical Area Planting (upland gullies)	1	5	4	4	20
Diversion	2	10	1	2	10
Filter Strip	3	15	2.5	7.5	37.5
Grassed Waterway	2	10	1	2	10
Irrigation System & Tailwater Recovery	0.5	2.5	0.5	0.25	1.25
Pipeline (on rangeland)	3	15	0.1	0.3	1.5
Pond Improvements	1	5	1.5	1.5	7.5
Restoration & Management of Sensitive Habitats				0	0
Cross fencing*	2	10	18	36	180
Pond construction	1	5	0.5	0.5	2.5
Sediment Basin	0.5	2.5	0.5	0.25	1.25
Underground Outlet	1	5	0.1	0.1	0.5
Totals	**20**	**100**	**--**	**99**	**497**
Totals for Stream and Upland Practices	**52.0**	**260.0**	**0.0**	**163.0**	**815**

*Cross fencing disturbance calculated by multiplying NRCS' estimate maximum of 5 miles of fenceline by estimated disturbance width of 30 feet.

The NRCS estimates that the Program would impact a maximum of approximately 163 acres annually, the majority of which would occur during Invasives Removal, Access Road Improvements, and Cross Fencing, practices less likely to cause adverse effects to California red-legged frog critical habitat. The action area contains 180,240 acres of critical habitat for the California red-legged frog. If we assume a "maximum disturbance" scenario in which all practices occurred at the maximum annual disturbance (163 acres) in critical habitat for the California red-legged frog, approximately 0.09 percent of designated critical habitat would be impacted. This percentage would increase slightly when considering the indirect impacts associated with concentrated livestock activity. This "maximum disturbance" scenario is highly unlikely to occur, in part because California red-legged frog critical habitat covers a relatively small portion of the action area, not all practices will be implemented every year, not all practices would cause the maximum estimated disturbance, and not all practices would disturb habitat containing PCEs. In addition, we expect the vast majority of disturbance and its effects to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. Further, we expect the Program to result in long-term improvement in the function and productivity of critical habitat for the California red-legged frog. Therefore, we expect the Program to cause minimal adverse effects to critical habitat, and we expect critical habitat for the California red-legged frog to continue to serve its intended conservation functions during implementation of the Program.

California Tiger Salamander

The action area contains the majority of one critical habitat unit (approximately 6,623 acres; a portion of the unit is in Kern County) for the Central California DPS of the California tiger salamander. The unit is degraded by human activities including agriculture, grazing, limited development, roads and likely chemical applications. California tiger salamander critical habitat contains elements (PCEs) that are essential for the conservation of the species, described briefly as standing bodies of fresh water of sufficient hydroperiod for California tiger salamanders to complete breeding, barrier-free uplands that contain small mammal burrows adjacent to breeding ponds, and upland dispersal habitat between occupied California tiger salamander locations. California tiger salamander critical habitat serves the following conservation functions:

1. Provide sufficient aquatic habitat for breeding;
2. Provide upland habitat as refugia for adults to maintain and sustain populations of California tiger salamanders throughout their range; and
3. Provide those habitat components essential for the conservation of the species.

Program activities would occur primarily in previously disturbed habitat that does not contain the PCEs of critical habitat for the California tiger salamander. However, critical habitat for the species contains substantial agriculture, grazing, and upland habitat (i.e., typical components of areas subject to Program activities); and we expect Program activities to occur in California tiger salamander critical habitat over the course of the Program. That said, critical habitat for this species comprises a very small percentage of the action area, and we expect Program activities to occur in this area infrequently.

Most practices that could adversely affect the PCEs of critical habitat for the California tiger salamander would cause temporary ground disturbance from construction equipment (e.g., trenching), vehicles, or foot traffic. We expect disturbed habitat to recover through natural recovery or active restoration by the NRCS. We also expect the projects implemented under the proposed Program within California tiger salamander critical habitat units to ultimately improve the overall quality of habitat in these areas.

Some practices (e.g., pond improvements), if installed in California tiger salamander critical habitat, will likely adversely affect upland critical habitat through ground disturbance and compromising rodent burrows and would likely affect aquatic habitat as sediment is removed; however, such practices may also create/improve other PCEs (breeding habitat) and benefit the species. Given the seasonal work restrictions and small project footprints proposed by the NRCS, we do not expect these effects to fragment dispersal habitat or disrupt ponded habitat during the breeding season. We expect impacts from these practices to be temporary as the habitat recovers through natural recovery or active restoration by the NRCS. These practices should maintain or improve the quality of critical habitat over the course of the Program.

Other practices (e.g., grade stabilization, pipeline), while certain to cause ground disturbance, may not affect PCEs under every application. For example, installing a pipeline could cause ground disturbance in a critical habitat unit; however, if no rodent burrows are affected and dispersal habitat is maintained by filling all open trenches, then the PCEs may not be damaged. We expect impacts from these practices to be temporary as the habitat recovers through natural recovery or active restoration by the NRCS. The NRCS proposes measures, such as pre-planning surveys and seasonal work restrictions, to minimize impacts to critical habitat and these measures should reduce the extent of disturbance and adverse effects to critical habitat.

The irrigation system and tailwater recovery practice could have longer term or permanent impacts to a critical habitat unit. This practice would replace critical habitat with ponded habitat of insufficient hydroperiod to support amphibian breeding and would contain potential threats (e.g., pumps, poor water quality) of injury or death. Construction of a tailwater recovery basin would remove a maximum of 0.5 acre of critical habitat; however, indirect effects of the practice as an attractive nuisance could extend beyond the basin footprint and degrade the quality of a critical habitat unit. That said, the intent of this practice is to reduce contaminant runoff from agricultural fields, and any adverse effects of this practice may be offset by improvements to water quality in critical habitat downstream of irrigation system and tailwater recovery practices.

Cross-fencing would be installed to move livestock away from riparian or overgrazed areas and concentrate activity around a landowner-provided water source. Managing livestock to prevent overgrazing and associated erosion issues would maintain or improve the quality of a critical habitat unit; however, concentrating livestock around a pond in California tiger salamander critical habitat could cause extensive ground disturbance and degrade critical habitat and PCEs in that area. We expect adverse effects from cross-fencing to occur infrequently as the NRCS proposes to install two cross-fences per year in the entire action area (Table 1).

The NRCS estimates that the Program would impact a maximum area of approximately 163 acres per year, and the action area contains 6,623 acres of critical habitat for the California tiger salamander. If we assume a "maximum disturbance" scenario in which all practices occurred at the maximum annual disturbance (163 acres) in critical habitat for the California tiger salamander, approximately 2.5 percent of designated critical habitat would be impacted. This percentage would increase slightly when considering the indirect impacts associated with concentrated livestock activity. This "maximum disturbance" scenario is highly unlikely to occur, in part because California tiger salamander critical habitat covers a very small portion of the action area, not all practices will be implemented every year, not all practices would cause the maximum estimated disturbance, and not all practices would disturb habitat containing PCEs. In addition, we expect the vast majority of disturbance and its effects to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. Further, we expect the Program to cause long-term improvement in the function and productivity of critical habitat for the California tiger salamander. Therefore, we expect the Program to cause minimal adverse effects to critical habitat, and we expect critical habitat for the California tiger salamander to continue to serve its intended conservation functions during implementation of the Program.

Vernal Pool Fairy Shrimp

The PCEs for vernal pool fairy shrimp critical habitat can be briefly described to include hydrologically connected mounds, swales, and depressions; seasonally inundated depressional features that hold water for a minimum of 18 consecutive days (Helm 1998); sources of food contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves; and organic and/or inorganic structure within the pools that provides shelter.

To avoid or minimize the effects of the Program on vernal pool fairy shrimp critical habitat, the NRCS proposed to avoid individual vernal pools and vernal pool complexes, and ground disturbance adjacent to vernal pools, if required for practice installation, will not alter surface and subsurface hydrologic processes to the detriment of the vernal pool or vernal pool complex. This would minimize impacts of the Program on critical habitat; however, non-traditional vernal pool fairy shrimp habitat (e.g., seasonally wetted stock ponds) that qualifies as a PCE occurs in the species' critical habitat and could be affected by Program activities.

The action area contains approximately 48,529 acres in 2 units (includes 6 sub-units of Unit 29) of critical habitat for the vernal pool fairy shrimp. One critical habitat unit (Unit 30) is just north of Soda Lake in the Carrizo Plain and is identical to the critical habitat described below for the longhorn fairy shrimp. This unit contains a few small streams, and there may be limited livestock activity in the critical habitat unit; however, Program activities would occur rarely in this unit, because the land use in the critical habitat unit is primarily rural residential and generally would not require the services provided by the Program. Therefore, we expect few, if any, projects to occur in in this critical habitat unit.

The other six critical habitat units are located in the north-central part of the County around the City of Paso Robles and on the border with Monterey County. Urbanized portions of these units are outside the scope of the program; however, the vast majority of land in the six northern units is rural and/or agricultural and could be subject to Program activities.

The primary land uses in these units that could qualify for Program assistance include grazing, vineyards, and orchards. Projects could address accelerated upland erosion and sediment, nutrient, herbicide, or pesticide runoff from agricultural operations. Program projects, if implemented in a critical habitat unit, would not affect vernal pools directly, because practices would occur outside vernal pools and would not affect the hydrology to the detriment of the pools or pool complexes. Practices that improve the quality of water flowing into vernal pools would have beneficial effects.

We anticipate that Pond Improvements and Restoration and Management of Declining Habitats could be used to address cattle grazing in the critical habitat unit, and some aspects of these practices could directly affect non-traditional, seasonal pools and disturb or destroy PCEs for the vernal pool fairy shrimp. Maintenance of a pond may include restoring the pond's original storage capacity. PCEs could be lost if the pool is too deep or the hydroperiod is too long and vernal pool fairy shrimp are no longer able to persist in the pond. Alternatively, if the NRCS creates seasonal ponds for use by livestock, it may function as habitat for vernal pool fairy shrimp and augment the PCEs in that critical habitat unit.

We do not expect the potential effects of the Program to cause more than minor adverse effects to critical habitat for the vernal pool fairy shrimp, because only non-traditional habitat should be adversely affected. Further, the species' critical habitat comprises a small fraction of the action area, and we expect projects to affect this species' PCEs rarely. In addition, the amount of critical habitat that could be affected by Program activities is a small fraction of the species' total critical habitat in the action area (48,529 acres). If we assume a "maximum disturbance" scenario in which all of these practices occurred at the maximum annual disturbance (163 acres) in critical habitat for vernal pool fairy shrimp, approximately 0.3 percent of all designated critical habitat would be impacted. This "maximum disturbance" scenario is highly unlikely to occur, because vernal pool fairy shrimp critical habitat covers a small portion of the action area, not all practices will be implemented every year, not all practices would cause the maximum estimated disturbance, and not all practices would disturb habitat containing PCEs. Therefore, we anticipate minimal adverse effects to critical habitat from the proposed Program. In addition, we expect the disturbance and its effects to be temporary, and we expect the Program to cause long-term improvement in the function and productivity of critical habitat for vernal pool fairy shrimp.

Longhorn Fairy Shrimp

The action area contains 9,601 acres of critical habitat for the longhorn fairy shrimp (71 FR 7118). The PCEs for longhorn fairy shrimp critical habitat can be briefly described to include hydrologically connected mounds, swales, and depressions; seasonally inundated depressional

features that hold water for a minimum of 23 consecutive days (Helm 1998); sources of food contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves; and organic and/or inorganic structure within the pools that provides shelter.

The NRCS proposed to avoid individual vernal pools and vernal pool complexes, and ground disturbance adjacent to vernal pools, if required for practice installation, will not alter surface and subsurface hydrologic processes to the detriment of the vernal pool or vernal pool complex. However, non-traditional longhorn fairy shrimp habitat (e.g., seasonally wetted stock ponds) could occur in critical habitat and could be affected by Program activities. That said, although there are a few minor drainages in the critical habitat unit, and there may be limited grazing in the critical habitat unit, Program activities are unlikely to occur in critical habitat for the longhorn fairy shrimp, because the critical habitat unit occupies a small fraction of the action area, and land use in the critical habitat unit is mainly rural residential and generally would not require the services provided by the Program. Therefore, we expect few, if any, projects to occur in critical habitat for the longhorn fairy shrimp and any effects to the species' PCEs would be minor.

Morro Shoulderband Snail

The PCEs for Morro shoulderband snail critical habitat can be briefly described to include sandy soils, a slope of 10 percent or less, and coastal dune scrub vegetation. The Service designated three units (a sum of 2,566 acres) of critical habitat for the Morro shoulderband snail. The minority of designated critical habitat would be subject to Program activities. Unit 1contains 1,830 acres (approximately 71 percent of designated critical habitat), most or all of which is outside the scope of the Program, because the land is in active dune areas or the coastal strand. Units 2 and 3 contain 320 acres and 420 acres of designated critical habitat, respectively. In total, we estimate that less than 30 percent, of designated critical habitat for the Morro shoulderband snail would be subject to effects from Program activities. This is a very small fraction of the action area. In addition, most of the threats to the species' critical habitat (development, recreation, habitat succession) are not addressed by Program practices. Therefore, we expect Program activities to affect critical habitat for the Morro shoulderband snail rarely, if ever.

Non-native vegetation is a threat to critical habitat for the Morro shoulderband snail and could be addressed by the Restoration and Management of Declining Habitats practice. This practice involves removing invasive plant species and restoring the area with native plants. While removal of non-native plant species would have long-term benefits for the Morro shoulderband snail, the species is known to use some non-native plant species (e.g., veldt grass, ice plant), and critical habitat PCEs (soils and native plants) may be temporarily disturbed by habitat loss. The maximum size of the Restoration and Management of Declining Habitats practice is 5 acres, or approximately 0.2 percent of all designated critical habitat. If this practice did occur in Morro shoulderband snail critical habitat, far less than 5 acres of PCEs would be affected, because the primary disturbance would be to non-native plants. Given the small area of Morro shoulderband

snail critical habitat subject to Program activities relative to the entire action area, we do not expect this practice to occur in the species' critical habitat more than once over the duration of the Program. Therefore, we do not expect the potential effects of the Program to cause more than minor, temporary adverse effects to critical habitat for the Morro shoulderband snail.

La Graciosa Thistle

The PCEs for La Graciosa thistle can be briefly described to include mesic areas wetted by fresh or brackish water, native plant communities typically associated with La Graciosa thistle habitat, sandy soils, and features that allow for dispersal and connectivity. La Graciosa thistle critical habitat in the action area is currently affected by invasive plant species, nutrient inputs from agricultural operations outside the critical habitat unit, and disturbance from grazing. These threats could be addressed by Program activities, and the NRCS proposed measures to avoid impacts to individual La Graciosa thistle plants; however, it is conceivable that Program practices could adversely affect the PCEs of critical habitat for this species.

The action area contains portions of two critical habitat units for the La Graciosa thistle. Unit 1 occurs between the Santa Maria River and the City of Oceano in the southwest corner of the County. The unit includes many sub-units totaling 9,690 acres; however, 2,404 acres are on Federal land and are outside the scope of the Program. The vast majority of the balance of this unit falls within a dune sheet/coastal strand and also is outside the scope of the Program. Therefore, only peripheral areas of the unit near the northern, eastern, and southern boundary may be subject to Program activities. The action area also includes a portion of critical habitat Unit 2—along approximately 5 miles of the Santa Maria River downstream of Highway 1. The southern bank of the Santa Maria River is in Santa Barbara County, and the Santa Maria River estuary is outside the scope of the Program. Thus, only the northern half of the river channel between Highway 1 and the estuary is in the action area. We do not have an estimate of the acres of La Graciosa thistle critical habitat that would be subject to Program activities, but it is a very small fraction of the action area, and we expect Program activities to occur in La Graciosa thistle critical habitat rarely.

Non-native vegetation could be addressed by the Restoration and Management of Declining Habitats practice. This practice involves removing invasive plant species and restoring the area with native plants. While removal of non-native plant species would have long-term benefits for the La Graciosa thistle, temporary disturbance of critical habitat PCEs (mesic areas, sandy soils, native plants) would occur. Mesic areas could be affected by sediment inputs or dewatering; sandy soils could be disturbed by vehicles and foot traffic; and native plants could be accidentally damaged by project workers or vehicles. The maximum size of the Restoration and Management of Declining Habitats practice is 5 acres; a very small fraction of designated critical habitat for the species. If this practice did occur in La Graciosa thistle critical habitat, far less than 5 acres of PCEs would be affected, because the primary disturbance would be to areas containing non-native plants.

Agricultural areas comprise most of the eastern boundary of the critical habitat unit, and Program activities in these areas could directly affect critical habitat through habitat disturbance or indirectly affect critical habitat through changes in water quality. A small number of water features in the critical habitat unit are adjacent to agricultural areas and could be subject to Program activities. Stream practices (e.g., Streambank Protection, Stream Crossing, Stream Habitat Improvement) could partially occur in mesic areas of critical habitat that border agricultural roads and fields. Workers and vehicles implementing these practices would cause ground disturbance that could temporarily adversely affect critical habitat for the La Graciosa thistle. Also, these practices could indirectly affect critical habitat by temporarily reducing downstream habitat quality through sedimentation or dewatering. Practices that address nutrient inputs from agricultural run-off would likely occur off-channel and outside the critical habitat unit. We expect these practices to have only beneficial effects as water quality is improved in downstream mesic areas in the critical habitat unit.

We anticipate that Pond Improvements, and Restoration and Management of Declining Habitats, could be used to address cattle grazing in the critical habitat unit. Improvement or maintenance of a pond could temporarily damage mesic areas or native plants that are PCEs for La Graciosa thistle critical habitat. However, if these areas already had been used by cattle, the PCEs may not be present and no additional impacts would occur from Program activities. Practices to prevent cattle from accessing sensitive habitats (e.g., fencing) would likely have only beneficial effects on La Graciosa thistle critical habitat.

Critical habitat for the La Graciosa thistle that could be subject to Program activities comprises a small fraction of the action area, and we expect projects to occur in La Graciosa thistle critical habitat rarely. In addition, the amount of critical habitat that could be affected by Program activities is a small fraction of the species total critical habitat (24,103 acres), and we do not expect the potential effects of the Program to cause more than temporary, minor, adverse effects to critical habitat for the La Graciosa thistle. However, if we assume a "maximum disturbance" scenario in which all practices occurred at the maximum annual disturbance (163 acres) in critical habitat for La Graciosa thistle, approximately 0.7 percent of all designated critical habitat would be impacted. This scenario is highly unlikely to occur, and we anticipate minimal adverse effects to critical habitat from the proposed Program. In addition, we expect the disturbance and its effects to be temporary, and we expect the Program to result in long-term improvement in the function and productivity of critical habitat for La Graciosa thistle.

Camatta Canyon Amole

The action area contains one critical habitat unit for the Camatta Canyon amole. The unit contains 4,378 acres, but 1,089 acres are in LPNF and are outside the scope of the Program. Thus, 3,289 acres of critical habitat for the species would be subject to Program activities. The PCEs for Camatta Canyon amole can be briefly described to include well-drained, red-clay soils; and a functioning ecosystem that supports native plant and animal species (including pollinators) typically associated with Camatta Canyon amole habitat. The NRCS proposed measures to

avoid impacts to individual Camatta Canyon amole plants; however, it is conceivable that Program practices could adversely affect the PCEs of critical habitat for this species.

Critical habitat for the Camatta Canyon amole that could be subject to Program activities comprises a small fraction of the action area, and we expect projects to occur in Camatta Canyon amole critical habitat rarely. In addition, the amount of critical habitat that could be affected by Program activities is a small fraction of the species total critical habitat (4,378 acres), and we do not expect the potential effects of the Program to cause more than minor adverse effects to critical habitat for the Camatta Canyon amole. If we assume a "maximum disturbance" scenario in which all practices occurred at the maximum annual disturbance (163 acres) in critical habitat for Camatta Canyon amole, approximately 4 percent of all designated critical habitat would be impacted. This scenario is highly unlikely to occur, because the species' critical habitat covers a small portion of the action area, not all practices will be implemented every year, not all practices would cause the maximum estimated disturbance, and not all practices would disturb habitat containing PCEs. Therefore, we anticipate minimal adverse effects to Camatta Canyon amole critical habitat from the proposed Program. In addition, we generally expect any disturbance and its effects to be temporary, and we expect the Program to result in long-term improvement in the function and productivity of critical habitat for Camatta Canyon amole.

Summary of Effects to Covered Species

In determining whether a proposed action is likely to jeopardize the continued existence of a species, we consider the effects of the action with respect to the reproduction, numbers, and distribution of the species. We also consider the effects of the action on the recovery of the species. In that context, the following paragraphs summarize the effects of the proposed Program on covered species. We grouped species that share similar habitats and life history strategies, and that will be similarly affected by the proposed Program.

California Red-legged Frog and California Tiger Salamander

Reproduction

The NRCS proposes seasonal work restrictions to avoid amphibian breeding seasons, and we do not expect Program activities to adversely affect breeding amphibians, egg masses/strands, or tadpoles. During the non-breeding season, certain projects would occur in permanent or seasonal aquatic habitat and may temporarily reduce the quantity and quality of feeding, breeding, and sheltering habitat in small, localized areas within the action area; however, due to the small footprint of the proposed Program activities, and the NRCS' proposed avoidance and minimization measures, the action area and the larger geographic ranges of these species would continue to support breeding amphibians during and after the Program is implemented.

Number

We are unable to determine the number of California red-legged frogs and California tiger salamanders that occur in the action area and may be affected by Program activities, because (1)

the action area for the proposed Program is large and ecologically diverse, (2) Program activities would occur over a 5-year period in, as of now, undetermined locations, and (3) amphibian populations fluctuate spatially and temporally based on biotic and abiotic factors.

Because of the protective measures outlined in the Description of the Proposed Action section of this biological opinion, we do not anticipate the injury or death of egg masses/strands or tadpoles as a result of Program activities. We also expect that most adult and juvenile amphibians translocated from project areas will likely survive after translocation. We acknowledge that not all California red-legged frogs and California tiger salamanders will be detected during surveys, which may result in the injury or death of a small number of individuals due to project activities; however, these species occupy large geographic ranges relative to the potential disturbance area of the Program, and the anticipated loss of individuals will not appreciably affect these species' numbers in the action area or rangewide.

Distribution

The California red-legged frog and California tiger salamander occupy relatively large geographic ranges outside the action area. The California red-legged frog generally occurs in coastal watersheds between San Francisco and Los Angeles. The Central California DPS of the California tiger salamander occupies portions of the San Joaquin Valley and coastal Counties in central California. Any effects to these species by Program activities would affect a small portion of the action area, and a very small fraction of these species' ranges. Therefore, the Program would not appreciably affect the larger geographic distribution of these species.

We determined that 16 of the 18 proposed practices could affect potential California red-legged frog habitat and that 11 of the 18 proposed practices could affect potential California tiger salamander habitat (Appendix 2). The NRCS' estimates (Table 1) show that these practices could disturb a maximum of 98 acres of California red-legged frog habitat and a maximum of 82 acres of California tiger salamander habitat annually (Appendix 2). However, we anticipate a much lower disturbance potential from the Program, because (1) Program activities could occur anywhere in the action area and would not necessarily occur in these species' habitats each year, (2) it is unlikely that all practices would occur at the maximum disturbance level, (3) not all practices will be implemented every year, and (4) the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas. Therefore, we anticipate the NRCS will disturb an average of 20 acres of potential California red-legged frog habitat annually and 98 acres over the duration of the Program. We anticipate the NRCS will disturb an average of 8 acres of potential California tiger salamander habitat annually and 40 acres over the duration of the Program.

These estimates are small compared to the amount of habitat available to the species in the action area, and are tiny portions of the species' habitats rangewide. In addition, adverse effects of the Program would not be additive, because we expect the vast majority of disturbance caused by Program activities to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. For these reasons, the proposed

Program will not fragment habitat for these species and will not cause a meaningful reduction of the area occupied by these species.

Vernal Pool Fairy Shrimp and Longhorn Fairy Shrimp

Reproduction

The NRCS proposes to prohibit Program activities in vernal pools and require that projects not affect surface and subsurface hydrologic processes that support vernal pools. The NRCS also proposes measures to avoid or minimize effects of projects that occur in non-traditional fairy shrimp habitat including working when the soil is dry and replacing the top-most layer of soil when work is complete. These measures will minimize the effects of projects on fairy shrimp reproduction, but Program activities may still have limited adverse effects on reproduction if cysts are moved, killed, or otherwise are not in a position to take advantage of breeding conditions after the project is complete. These effects could reduce, but would not prevent, breeding in affected habitat. Therefore, effects to reproduction in the action area would be minimal, and the Program would not have appreciable effects on these species' reproduction rangewide.

Number

We are unable to determine the number of vernal pool fairy shrimp and longhorn fairy shrimp that occur in the action area and may be affected by Program activities, because (1) the action area for the proposed Program is large, (2) fairy shrimp populations fluctuate spatially and temporally based on a variety of factors, (3) not all fairy shrimp are active in a given year, and (4) Program activities would occur over a 5-year period in, as of now, undetermined locations.

Because of the protective measures outlined in the Description of the Proposed Action section of this biological opinion, we do not anticipate the permanent loss of fairy shrimp habitat and anticipate only on rare occasions could breeding habitat a suitable pool be disrupted. In addition, the NRCS would salvage and replace the top layer of soil to reduce impacts to the fairy shrimp population(s) in a pool. Therefore, we do not expect a substantial loss of fairy shrimp individuals in the action area, and we do not expect Program activities to appreciably the number of vernal pool fairy shrimp and longhorn fairy shrimp rangewide.

Distribution

The vernal pool fairy shrimp occupies a large geographic range outside the action area (generally coastal watersheds from Riverside County to southern Oregon). The longhorn fairy shrimp's more limited range still includes habitat in at least three California Counties from San Luis Obispo County to Contra Costa County. Both species occupy ephemeral habitat found in thousands of acres in the action area. The Program would potentially disturb a small amount of non-traditional habitat occupied by fairy shrimp. While maintenance and creation of certain ponds may render aquatic habitat unsuitable for these species, we generally expect disturbance from Program activities to be almost exclusively temporary and minimal relative to the habitat available in the action area.

We determined that 9 of the 18 proposed practices could affect potential fairy shrimp habitat (Appendix 2). According to the NRCS estimates (Table 1), these 9 practices could impact a maximum of 73 acres of non-traditional vernal pool habitat annually. However, we anticipate a much lower disturbance potential from the Program, because (1) it is unlikely that all of this disturbance would occur in the species' habitat in the same year, (2) it is unlikely that all practices would occur at the maximum disturbance level, (3) the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas, and (4) 56 of the 73 acres of estimated disturbance would be caused by invasive plant removal and cross fencing; both of these practices are unlikely to disturb fairy shrimp habitat if the NRCS' minimization measures are implemented correctly. Therefore, we anticipate the Program activities will disturb an average of 3.4 acres ((73 acres – 56 acres) / 5 years) of potential fairy shrimp habitat annually and 17 acres over the duration of the Program. Seventeen acres is less than 0.2 percent of the known habitat for longhorn fairy shrimp in the action area and a far smaller percentage of known habitat for the vernal pool fairy shrimp in the action area. In addition, adverse effects of the Program would not be additive, because we expect the vast majority of disturbance caused by Program activities to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. Therefore, the proposed Program will not fragment habitat for these species and will not cause a meaningful reduction of the area occupied by these species in the action area or rangewide.

San Joaquin Kit Fox

The San Joaquin kit fox is ecologically linked to the giant kangaroo rat, and impacts to the giant kangaroo rat can affect the San Joaquin kit fox. The NRCS is proposing measures to avoid or minimize impacts to the giant kangaroo rat, and we do not expect the impacts of the proposed Program on the giant kangaroo rat to measurably compound the Program's impacts on the San Joaquin kit fox.

Reproduction

The NRCS proposes seasonal work restrictions to avoid direct impacts to the San Joaquin kit fox and to further minimize indirect impacts during the breeding season. During the non-breeding season, certain projects in upland habitat would occur that may temporarily reduce the quality of habitat for the San Joaquin kit fox in small, localized areas; however, we do not expect the proposed activities to occur over a large enough area to disrupt reproduction for a pair of kit foxes in the following breeding season. The practices with the largest potential disturbance areas, Access Road Improvements and Restoration and Management of Sensitive Habitats (Cross Fencing), have linear footprints, have temporary impacts, and would occur at a small scale relative to the expected homerange of a kit fox (3,840 acres) in the action area. Therefore, we do not expect Program activities to disrupt San Joaquin kit fox breeding during or after the Program is implemented.

Number

We do not have an estimate of the number of San Joaquin kit foxes that inhabit the action area. The most recent survey efforts indicate that, outside of the Carrizo Plain area, kit fox density is very low in the action area. This suggests that Program practices would have a low chance of occurring in habitat occupied by the species. In addition, not all practices will be implemented every year, and not all practices would cause the maximum estimated disturbance. Lastly, the small size of the practices relative to a kit fox' homerange, the generally temporary nature of the expected disturbance, and the avoidance and minimization measures proposed by the NRCS, further reduce the chance of kit foxes being adversely affected. Therefore, we expect Program activities to affect very few, if any, San Joaquin kit foxes in the action area, and we do not expect the Program to measurably reduce the number of San Joaquin kit foxes across the species' larger geographic range.

Distribution

The eastern half of the action area contains potential San Joaquin kit fox habitat, and although we know that kit foxes are most abundant in the Carrizo Plain, we do not know the exact distribution of the species in the action area. However, the San Joaquin kit fox occupies a geographic range that is large relative to the size of the action area, including portions of most Counties surrounding the San Joaquin Valley.

We determined that 14 of the 18 proposed practices could affect potential San Joaquin kit fox habitat (Appendix 2). The NRCS estimates (Table 1) show that these 14 practices could disturb a maximum of 72 acres of San Joaquin kit fox habitat annually. However, it is unlikely that all of this disturbance would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas or would not cause the type of disturbance that would preclude the species from using the project area (e.g., Cross Fencing). Lastly, adverse effects of the Program would not be additive, because we expect the vast majority of disturbance caused by Program activities to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. Thus, we anticipate the Program will cause disturbance of an average of 14 acres of potential San Joaquin kit fox habitat annually and 72 acres over the duration of the Program. These acreage estimates are a small fraction of the potential habitat for the San Joaquin kit fox in the action area and a far smaller percentage of the species' habitat rangewide. Therefore, Program activities would not fragment or reduce the distribution of this species in the action area or across the species' larger geographic range.

Giant Kangaroo Rat

Reproduction

The NRCS proposes surveys, seasonal work restrictions, and other measures to avoid impacts to the giant kangaroo rat during the species' typical breeding season. However, the giant kangaroo rat is known to breed into the Fall depending on environmental variables and population

structure. Williams et al (1993) observed extended breeding seasons when population density was low and sufficient food was available. Projects that occur in occupied giant kangaroo rat habitat during an extended breeding season could disturb breeding giant kangaroo rats in or nearby the Project area. Given the NRCS' proposal to avoid night work, conduct surveys, and enforce avoidance buffers around giant kangaroo rat precincts, the likelihood of Program activities causing failure of a breeding effort is very low. During the non-breeding season, the NRCS would apply these same measures, which would avoid or minimize impacts on resident giant kangaroo rats and their habitat. Therefore, we do not expect the proposed Program to prevent breeding by giant kangaroo rats in the action area during or after the Program is implemented, and we do not expect the Program to affect the species' reproduction rangewide.

Number

Giant kangaroo rats occupy relatively small territories and have habitat requirements that are not identifiable at the resolution of available aerial photographs or habitat maps. Surveys for this species have been completed for portions, but not the entire action area. In addition, Program activities would occur over a 5-year period in, as of now, undetermined locations. Therefore, we are unable to estimate the number of giant kangaroo rats that may occur in the action area and may be affected by Program activities. To examine potential effects on the giant kangaroo rat, we used potentially suitable habitat as a surrogate for population size. The species is known to occupy the Cuyama Valley and the Carrizo Plain, and potential giant kangaroo rat habitat generally occurs in the eastern third of the County in a north/northwest direction from these valleys, generally running parallel to the border with Kern County.

We determined that 8 of the 18 Program practices could affect potential giant kangaroo rat habitat (Appendix 2). The NRCS estimates (Table 1) show that these 8 practices could disturb a maximum of 51 acres of giant kangaroo rat habitat annually. However, it is unlikely that all of this disturbance would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the NRCS would avoid active precincts, and the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas. Lastly, adverse effects of the Program would not be additive, because we expect the vast majority of disturbance caused by Program activities to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. Thus, we anticipate the Program will cause disturbance of an average of 10 acres of potential giant kangaroo rat habitat annually and 51 acres over the duration of the Program. These estimates are a small fraction of the surrogate population of giant kangaroo rats in the action area and a far smaller percentage of the species' population rangewide. Therefore, Program activities would not appreciably reduce the number of giant kangaroo rats currently in the action area or rangewide.

Distribution

We are unable to estimate the precise distribution of giant kangaroo rats in the action area, because (1) giant kangaroo rats occupy small territories and have habitat requirements that are

not identifiable at the resolution of available aerial photographs or habitat maps, and (2) surveys of the entire action area have not been completed. In general, suitable habitat for the giant kangaroo rat occurs in the eastern third of the action area, from Cuyama Valley to the Carrizo Plain, and continuing in a northwest direction generally running parallel to the County border. The species' larger geographic range includes portions of at least five Counties on the western side of the San Joaquin Valley. As described above for "Number," we estimate that the Program could temporarily disturb an average of 10 acres of unoccupied giant kangaroo rat habitat annually and 51 acres over the duration of the Program. These estimates are a small fraction of the habitat available to the giant kangaroo rat in the action area and a far smaller percentage of the species' habitat rangewide. Therefore, Program activities would not fragment or reduce the distribution of the giant kangaroo rat in the action area or across the species' larger geographic range.

Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard is ecologically linked to the giant kangaroo rat, and impacts to the giant kangaroo rat can affect the blunt-nosed leopard lizard. The NRCS is proposing to avoid or minimize impacts to the giant kangaroo rat, and we do not expect the impacts of the proposed Program on the giant kangaroo rat to measurably compound the Program's impacts on the blunt-nosed leopard lizard.

Reproduction

The NRCS proposes to enforce avoidance buffers around blunt-nosed leopard lizard observations and active burrows to minimize impacts on individuals and the territories of resident blunt-nosed leopard lizards. These measures should minimize impacts of project activities; however, certain projects would occur in small, localized areas of upland habitat that may temporarily reduce the quality of habitat for this species. Blunt-nosed leopard lizards are polygamous (the territory of a male can overlap those of two or more females). In a "maximum disturbance" scenario, Program disturbance could temporarily affect breeding efforts for two or more blunt-nosed leopard lizards over one breeding season. Even in this scenario, we expect the action area to continue to support breeding blunt-nosed leopard lizards during and after the Program is implemented, because the number of blunt-nosed leopard lizards that would be affected is small relative to the species' population in the action area and rangewide, we expect relatively few projects to occur in the species' habitat, the projects generally would have small footprints, many of the projects would occur in previously disturbed habitat, and we expect impacts to the species' habitat to be temporary.

Number

We do not have an estimate of the number of blunt-nosed leopard lizards that inhabit the action area and may be affected by Program activities. Estimating a population size for the action area is difficult, because (1) most habitat occupied by the species in the action area occurs in the CPNM and is outside the scope of the Program, (2) the species is not found in all seemingly suitable habitat (i.e., during large scale surveys in the northern Carrizo Plain (Service 2011a,b)),

and (3) the species occupies most suitable habitat in the action area at low densities. However, this suggests that Program practices would have a low chance of occurring in habitat occupied by the blunt-nosed leopard lizard. In addition, not all practices will be implemented every year, and not all practices would cause the maximum estimated disturbance. Lastly, the generally temporary nature of the expected disturbance, and the avoidance and minimization measures proposed by the NRCS, further reduce the chance of blunt-nosed leopard lizards being adversely affected. Therefore, we expect Program activities to affect very few blunt-nosed leopard lizards in the action area, and we do not expect the Program to measurably reduce the number of blunt-nosed leopard lizards across the species' larger geographic range.

Distribution

Portions of the eastern half of the action area contain potential blunt-nosed leopard lizard habitat, and although we know that the species is most abundant in the Carrizo Plain, we do not know the species' exact distribution in the action area. However, the blunt-nosed leopard lizard occupies a geographic range that is large relative to the size of the action area, including portions of at least 10 Counties that border the west side of the San Joaquin Valley.

We determined that 8 of the 18 Program practices could affect potential blunt-nosed leopard lizard habitat (Appendix 2). The NRCS estimates (Table 1) show that these 8 practices could disturb a maximum of 51 acres of blunt-nosed leopard lizard habitat annually. However, it is unlikely that all of this disturbance would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the NRCS would enforce avoidance buffers around blunt-nosed leopard lizards and active burrows, and the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas. Lastly, adverse effects of the Program would not be additive, because we expect the vast majority of disturbance caused by Program activities to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in the species' habitat. Thus, we anticipate the Program will cause disturbance of an average of 10 acres of potential blunt-nosed leopard lizard habitat annually and 51 acres over the duration of the Program. These estimates are a small fraction of the blunt-nosed leopard lizard habitat in the action area and a far smaller percentage of the species' habitat rangewide. Therefore, Program activities would not fragment or reduce the distribution of the blunt-nosed leopard lizard in the action area or across the species' larger geographic range.

Least Bell's Vireo

Reproduction

The NRCS proposes seasonal work restrictions to avoid impacts to the least Bell's vireo during the breeding season. During the non-breeding season, certain projects in riparian habitat would occur that may temporarily reduce the quantity and quality of breeding habitat in small, localized areas. Removal of vegetation within an existing territory could disrupt reproduction for a pair of birds returning to that territory; however, least Bell's vireos occur at low density in the action

area, the species' habitat naturally experiences periodic disturbance, and the proposed Program activities could disturb a very small amount of habitat relative to the amount of habitat available in the action area and rangewide. Therefore, we expect that very few, if any, least Bell's vireos would be affected by Program activities, and the Program would not appreciably reduce least Bell's vireo reproduction in the action area or rangewide.

Number

We are unable to determine the number of least Bell's vireos that occur in the action area and may be affected by Program activities, because (1) the action area for the proposed Program is large, (2) surveys for this species do not occur throughout the action area, (3) Program activities would occur over a 5-year period in, as of now, undetermined locations, (4) suitable habitat for this species fluctuates spatially and temporally, and (5) in recent years the species has been incrementally re-occupying its former range. We estimate that fewer than 1 pair of least Bell's vireos annually will be adversely affected by Program activities, because the species occurs in the action area at low density, the species' habitat naturally experiences periodic disturbance, the Program would affect a small amount of habitat relative to that available to the species, and the NRCS would implement measures to avoid effects on least Bell's vireos during the breeding season and minimize effects on habitat during the non-breeding season. Therefore, very few, if any least Bell's vireos would be affected by Program activities in the action area, and the Program would not appreciably reduce least Bell's vireo reproduction rangewide.

Distribution

In the action area, least Bell's vireos are known to occur in riparian habitat along the Salinas River and Santa Maria River watershed. However, the least Bell's vireo has been expanding its range in recent years and could occur in any suitable habitat within the action area.

We determined that 9 of the 18 proposed practices could affect potential least Bell's vireo habitat (Appendix 2). The NRCS estimates show that these 9 practices could disturb a maximum of 41 acres annually; however, it is unlikely that all of this disturbance would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas. Further, adverse effects of the Program would not be additive, because we expect the vast majority of disturbance caused by Program activities to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. Therefore, considering the species' relatively limited known range in the action area and the NRCS' proposed minimization measures, we anticipate the Program will cause disturbance of an average of 8 acres of potential least Bell's vireo habitat (including non-native plant species suitable as foraging habitat) annually and 41 acres over the duration of the Program. These estimates are a small percentage of the available habitat in the action area and an inconsequential amount compared to the geographic range of the species, and the amount of disturbance expected from the Program would not reduce the distribution of the least Bell's vireo in the action area or rangewide.

Morro Shoulderband Snail

Reproduction

Some of the Program activities (e.g., invasive plant removal, capture and relocation) could temporarily disrupt Morro shoulderband snail reproduction. Program activities could disturb small, localized areas of habitat, making it temporarily unsuitable for reproduction until the habitat recovers or is restored. However, the action area contains a small percentage of the rangewide habitat for the Morro shoulderband snail, and we expect Program activities to occur in Morro shoulderband snail habitat only on rare occasions. Therefore, the Program would have minimal, temporary effects on reproduction by the species in the action area and would have inconsequential effects on reproduction of the species rangewide.

Number

We are unable to determine the number of Morro shoulderband snails that occur in the action area and may be affected by Program activities, because (1) surveys for the species do not occur throughout suitable habitat in the action area (2) the species' small size and cryptic life history makes identification difficult and population estimates unreliable, and (3) Program activities would occur over a 5-year period in, as of now, undetermined locations. Therefore, to examine potential effects on the Morro shoulderband snail, we used potentially suitable habitat as a surrogate for population size. The species occupies approximately 7,700 acres in the County, generally in and near the Cities of Los Osos and Morro Bay. However, most of the species' habitat is outside the scope of the program, and the species range in the action area is very limited.

We determined that 5 of the 18 proposed practices could affect potential Morro shoulderband snail habitat (Appendix 2). The NRCS estimates (Table 1) show that these 5 practices could disturb a maximum of 26 acres; however, it is unlikely that all of this disturbance would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas. Lastly, adverse effects of the Program would not be additive, because we expect the vast majority of disturbance caused by Program activities to be temporary, such that habitat disturbed in one year may recover or be restored before further disturbance occurs in a species' habitat. Considering the species' limited range in the action area and the NRCS' proposed minimization measures, we anticipate the Program will cause disturbance of an average of 2.2 acres of potential Morro shoulderband snail habitat (including non-native plant species suitable as foraging habitat) annually and 11 acres over the duration of the Program. These estimates are a small fraction of the species' surrogate population in the action area and a far smaller percentage of the species' population rangewide. Therefore, Program activities would not appreciably reduce the number of Morro shoulderband currently in the action area or rangewide.

Distribution
The Morro shoulderband snail occupies approximately 7,700 acres in the County, but most of this habitat is outside the scope of the Program. As described above in "Number," we estimate that the Program could temporarily disturb approximately 2.2 acres of habitat annually and 11 acres over the duration of the Program. These estimates are a small fraction of the habitat available to the Morro shoulderband snail in the action area and a far smaller percentage of the species' habitat rangewide. Therefore, Program activities would not fragment or reduce the distribution of the Morro shoulderband snail in the action area or across the species' larger geographic range.

Tidewater Goby

Reproduction
Estuaries and sloughs, the primary breeding habitats for tidewater gobies, are outside the scope of the Program, and we expect limited breeding to occur in the action area outside these habitats. Program activities occurring in occupied tidewater goby habitat in late fall and early winter may temporarily reduce the quantity and quality of breeding habitat in small, localized areas within the action area. The NRCS proposes seasonal work restrictions that would avoid the peak breeding season for tidewater gobies (April through July), and we do not expect the proposed Program to meaningfully impact tidewater goby reproduction in the action area or rangewide.

Number
We are unable to determine the number of tidewater gobies that may be affected by Program activities, because primary tidewater goby habitat is outside the scope of the Program, population numbers can fluctuate dramatically within and between years, and Program activities would occur over a 5-year period in, as of now, undetermined locations. The proposed activities include limited work in streams and dewatering of potential tidewater goby habitat. Despite capture and relocation efforts proposed by the NRCS, some tidewater gobies may be injured or killed. We do not expect this reduction in numbers to appreciably affect the number of tidewater gobies in the action area or rangewide, because (1) the species' primary habitat is outside the scope of the Program, (2) we expect tidewater goby numbers to be relatively low in the action area, (3) the NRCS proposes seasonal work restrictions that would avoid the peak breeding season for tidewater gobies (April through July), and (4) the NRCS proposes to minimize injury and death of tidewater gobies by capturing and relocating gobies and ensuring that gobies cannot re-enter a project area.

Distribution
The County contains 8 critical habitat units for the tidewater goby and several other sloughs/estuaries that are or could be occupied by the species over the course of the Program. Primary goby habitat in each waterway is in the estuary or slough, and this habitat is outside the scope of the Program; however, tidewater gobies within in the action area may be affected upstream of estuaries or sloughs. The NRCS proposes extensive measures to avoid and minimize impacts to tidewater gobies and the species' suitable habitat. The proposed activities

would not occur in primary tidewater goby habitat and would not cause extirpation of gobies from any occupied waterway. Therefore, the proposed Program would not reduce or fragment the distribution of tidewater gobies in the action area or rangewide.

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 and, therefore, are not considered cumulative to the proposed project.

Los Osos Habitat Conservation Plans

Landowners in the Los Osos area have prepared Habitat Conservation Plans (HCP) in support of the issuance of incidental take permits associated with limited development on non-Federal property. While the HCPs provide for conservation of the Morro shoulderband snail, include measures to avoid or minimize effects to individual snails and the species' habitat, and mitigate for impacts to the species; some level of adverse effects is expected from the implementation of the HCPs. To date, the individual HCPs have involved effects from development on small land parcels and in-lieu fees to mitigate the effects of any taking associated with the HCP. The fees are kept in an account managed by the National Fish and Wildlife Foundation and are used to fund recovery actions identified in the recovery plan or the onsite conservation of lands in a configuration that contributes to recovery of the Morro shoulderband snail.

Human Population Growth

San Luis Obispo County reported an overall population increase of 11 percent from 2000 to 2010 (County 2012). Development within the County is likely to increase due to the high demand for housing and industry in the area. Agriculture is still one of the largest industries in the County, with wineries being one of the largest sectors (with over 200 wineries in the County)(SLO Chamber 2012). Urbanization and agricultural expansion are common causes of habitat loss, fragmentation, and degradation. Riparian areas in several of the watersheds of San Luis Obispo County are also threatened in general by urban runoff, sedimentation, surface water diversions, off-road vehicles, and ground water pumping. However, for several reasons, including lack of access to many reaches of the streams and ponds, the degree to which these actions may affect listed species cannot be accurately determined at this time.

Other than general trends, we are currently unaware of other non-Federal actions that are reasonably certain to occur in the action area that may adversely affect the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, and tidewater goby. We are also currently unaware of any other non-Federal actions that

are reasonably certain to occur in the action area that may adversely affect designated critical habitat for the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, Morro shoulderband snail, La Graciosa thistle, and Camatta Canyon amole.

CONCLUSION

After reviewing (1) the current status of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, and tidewater goby; (2) the environmental baseline for these species in the action area; (3) the effects of the proposed action; and (4) the cumulative effects, it is our biological opinion that the NRCS' proposed implementation of the San Luis Obispo County Partners in Restoration Permit Coordination Program is not likely to jeopardize the continued existence of any of these species or destroy or adversely modify designated critical habitat for the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, Morro shoulderband snail, La Graciosa thistle, and Camatta Canyon amole. We have reached these conclusions because:

1. The Program would not appreciably reduce the rangewide reproduction, number, or distribution of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, or tidewater goby;
2. The NRCS proposes seasonal or conditional work restrictions intended to preclude impacts to breeding California red-legged frogs, California tiger salamanders, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit foxes, giant kangaroo rats, least Bell's vireos, and tidewater gobies;
3. A small proportion of the ranges of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, and tidewater goby would be affected by Program activities;
4. If California red-legged frogs, California tiger salamanders, Morro shoulderband snails, or tidewater gobies are found in the project area, they will be relocated to areas where they are unlikely to be further impacted by Program activities;
5. Conservation practices implemented as a result of the Program, such as planting vegetation in critically eroding areas, installing watering troughs to remove livestock from riparian areas, and removing exotic vegetation will provide a long-term benefit to listed species and their habitat; and,
6. The NRCS proposed extensive species protective measures as part of the Program. These measures will avoid or reduce adverse effects of the Program on listed species and their habitat.

Critical Habitat

1. The Project would potentially result in the temporary loss of critical habitat containing the PCEs for the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, Morro shoulderband snail, La Graciosa thistle, and Camatta Canyon amole, within the Program area; however, as a result of protective measures included as part of the proposed Program and the small size of Program practices, the stated function of the critical habitat units will be maintained.
2. The proposed Program would affect a small amount of, if any, designated critical habitat for longhorn fairy shrimp, Morro shoulderband snail, and La Graciosa thistle, and any adverse effect would be temporary.
3. Program activities are expected to have an overall beneficial effect on designated critical habitat and PCEs for the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, Morro shoulderband snail, La Graciosa thistle, and Camatta Canyon amole.
4. The Program would not appreciably reduce the ability of the critical habitat units within San Luis Obispo County to support the recovery of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, Morro shoulderband snail, La Graciosa thistle, or Camatta Canyon amole.

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 to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further 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. Harass is defined by the Service as an intentional or negligent act or omission that creates the likelihood of injury to 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. 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 that is 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 the NRCS must implement them or include them as binding conditions of any cooperator agreement associated with the proposed action for the exemption in section 7(o)(2) to apply. The NRCS has a continuing duty to regulate the activity covered by this incidental take statement. If the NRCS fails to, or fails to require its contractors to, adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to its authorization or cooperator agreements, the protective

coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the NRCS must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement [50 CFR §402.14(i)(3)].

We anticipate that incidental take of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, and tidewater goby may occur as a result of the following activities that are evaluated in this biological opinion: capture and relocation (California red-legged frog, California tiger salamander, Morro shoulderband snail, or tidewater goby); modification of habitat features (e.g., small mammal burrows, California red-legged frog breeding ponds, San Joaquin kit fox burrows, etc.); soil excavation and grading; grade and stream channel stabilization; channel excavation; construction of earthen embankments; placement of fill; burial, trampling, or crushing from vehicles and foot traffic; limited removal of vegetation; or noise generated by workers and project activities. We do not expect take via pursuit, hunting, shooting, trapping, or collection as a result of the Program.

The NRCS used experience gained from previous Permit Coordination Programs to estimate the frequency with which each proposed practice would be implemented. We applied these estimates to our effects determinations to anticipate take levels over the 5-year duration of the Program; however, we cannot determine exactly when, and if, this take would occur. Because of the uncertainty in anticipating the actual number of individuals of listed animal species that would be taken by the proposed project, where appropriate we are using habitat disturbance as a surrogate indicator that take has occurred. The take levels at which we expect the NRCS to reinitiate consultation are also defined in terms of the areal extent of habitat disturbed. We developed our take estimates under the assumption that the NRCS will implement projects/practices at the frequency estimated in Table 1. The Service and NRCS will coordinate through the pre-construction notification process (described in the Notification and Communication Procedures section of this biological opinion) to determine whether project-related disturbance would count toward the respective habitat disturbance/take limits.

Incidental Take of the California Red-legged Frog

We expect the California red-legged frog to be the species most widely affected by the Program, as the species could be found in any project area that occurs in, or within a few hundred feet of, any freshwater habitat in the action area. The species could be found in aquatic habitat, in riparian corridors, underground in rodent burrows aestivating, or in seemingly unsuitable habitat during migration/dispersal season.

The NRCS proposed seasonal work restrictions that should avoid impacts to California red-legged frog egg masses and tadpoles, and we do not expect take of these life stages to occur as a result of the Program.

We anticipate that all juvenile and adult California red-legged frogs observed in harm's way in a project site are subject to capture and relocation. While capture and relocation of California red-legged frogs is intended to reduce the likelihood of injury or death as a result of project activities, some individuals may be wounded or killed as a result of capture and being moved to potentially unfamiliar habitat. Further, repeated exposure to vibration, human presence, and other anthropogenic stressors could contribute to harassment of affected California red-legged frogs. California red-legged frogs are known to quickly attempt to return to the point of capture and certain individuals may be subject to multiple captures, desiccation, and increased predation while attempting to return. Any California red-legged frogs that evade detection, capture, and relocation, and remain in a project area may be crushed by construction equipment, vehicles, or foot traffic, or may be otherwise wounded or killed during the proposed activities. The NRCS' proposal to employ a Service-approved individual to conduct survey, capture, and relocation should minimize the risk of this happening.

We determined that 16 of the 18 proposed practices could affect potential California red-legged frog habitat (Appendix 2). The NRCS' estimates (see Table 1) show that these practices could disturb a maximum of 98 acres annually; however, it is unlikely that all 16 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas or in areas that allow movement by California red-legged frogs but do not provide feeding, breeding, or sheltering habitat. For example, if cross fencing temporarily disturbed 36 acres of undeveloped uplands without rodent burrows, this practice would not prevent the species from using the habitat in the same way it would have prior to cross fencing. Therefore, we anticipate the NRCS will disturb an average of 20 acres of potential California red-legged frog habitat annually and 98 acres over the duration of the Program.

Accordingly, we would not expect that ground disturbance in the following situations would result in take and therefore would not be counted towards the annual 20 acres of disturbance:

1. Program activities that occur in highly disturbed areas (e.g., roadways, tilled fields);
2. Implementation of a practice that does not prevent movement by California red-legged frogs or prevent the species from using the habitat in the same way it would have prior (e.g., cross fencing); or
3. Disturbance in upland areas that do not contain feeding, breeding, or sheltering habitat for the species.

It is difficult to determine the effects that the temporary disturbance of 20 acres would have on the California red-legged frog, because the species uses a variety of different habitats in different spatial arrangements throughout a rain cycle. Disturbance of 20 acres of aquatic or riparian habitat, which can support a high density of individuals, would have a much higher level of impact than disturbance of 20 acres of upland, dispersal habitat. That said, it is plausible that Program activities could disturb California red-legged frog homeranges to the extent that

essential behavioral patterns are significantly impaired, and it is impossible to determine in advance, the minimum extent of habitat alteration that would cause harm of a particular individual. Therefore, we anticipate that Program activities would change the composition of two California red-legged frog territories annually, making the area less appealing for the species and causing harm of two individuals. Accordingly, we expect harm of 10 California red-legged frogs over the duration of the Program.

Given the difficulty in detecting take of the California red-legged frog, the collective amount of incidental take of California red-legged frogs via harassment, harm, wounding, and killing that we anticipate may occur as a result of Program activities is 4 per year and 20 over the 5-year term of the Program. We arrived at this take level by considering that (1) one California red-legged frog could be harassed, harmed, wounded, or killed each time a project is implemented in or near California red-legged frog habitat; (2) take of California red-legged frogs can be difficult to detect; and an instance of observed take likely indicates that other unobserved take has occurred; (3) California red-legged frogs will not occur at every project site; and (4) Service-approved individuals will be effective in minimizing wounding or death as a result of Program activities. In the absence of observations of take, the temporary disturbance of 20 acres of the species' habitat annually will be a surrogate indicator that our anticipated annual level of take has been reached.

Because we do not anticipate take of any egg masses, tadpoles, or larvae of the California red-legged frog, if any are found injured or dead and the cause can be linked to Program activities, the NRCS must contact the Service to determine whether formal consultation should be re-initiated. Program activities that could cause take should cease until consultation is completed.

Incidental Take of the California Tiger Salamander

California tiger salamanders are generally known to occur in the northeastern part of the action area, and the species is less likely to be affected by Program activities than a wider-ranging species. We anticipate that the species could be found in any project area in the northeastern part of the County. The species could be found in seasonally ponded wetlands; and within 1.2 miles of seasonally ponded wetlands in rodent burrows, upland habitat, and seemingly unsuitable habitat during migration/dispersal season.

The NRCS has proposed seasonal work restrictions that should avoid impacts to California tiger salamander egg masses and tadpoles, and we do not expect take of these life stages to occur as a result of the Program.

We anticipate that all juvenile and adult California tiger salamanders observed in harm's way in a project site would be subject to capture and relocation. While capture and relocation of California tiger salamanders is intended to reduce the likelihood of injury or death as a result of project activities, some individuals may be wounded or killed as a result of capture and being moved to potentially unfamiliar habitat. Any California tiger salamanders that evade detection,

capture, and relocation, and remain in a project area may be crushed by construction equipment, vehicles, or foot traffic, or may be otherwise wounded or killed during the proposed activities.

California tiger salamanders occur in habitat (i.e., rodent burrows) that is difficult to survey, and the NRCS proposes pre-construction surveys that are narrow in scope. Therefore, some individual salamanders are likely to evade detection, capture, and relocation. The NRCS' proposal to employ a Service-approved individual to conduct survey, capture, and relocation efforts should reduce the risk of this happening. However, project activities that occur in suitable habitat and grade, collapse, flood, or otherwise destroy or damage rodent burrows may harm, wound, or kill California tiger salamanders. Due to the California tiger salamanders' small body size and fossorial nature, incidental take via wounding or killing as a result of Program activities will be difficult to detect.

We determined that 11 of the 18 proposed practices could affect potential California tiger salamander habitat (Appendix 2). These practices could result in wounding or killing of juvenile or adult California tiger salamanders if implemented in occupied California tiger salamander habitat. The NRCS estimates (Table 1) show that these 11 practices could disturb a maximum of 82 acres annually; however, it is unlikely that all 11 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas or in areas that allow movement by California tiger salamanders but do not provide feeding, breeding, or sheltering habitat. For example, if cross fencing temporarily disturbed 36 acres of undeveloped uplands without rodent burrows, this practice would not prevent the species from using the habitat in the same way it would have prior to cross fencing. Finally, considering the species' very limited range in the action area and the NRCS' proposed minimization measures, we anticipate the NRCS will disturb an average of 8 acres of potential California tiger salamander habitat annually and 40 acres over the duration of the Program.

Accordingly, we would not expect that ground disturbance in the following situations would result in take and therefore would not be counted towards the annual 8 acres of disturbance:

1. Program activities that occur in highly disturbed areas (e.g., roadways, tilled fields);
2. Implementation of a practice that does not prevent movement by California tiger salamanders or prevent the species from using the habitat in the same way it would have prior (e.g., cross fencing); or
3. Disturbance in upland areas that do not contain feeding, breeding, or sheltering habitat for the species.

We expect take of California tiger salamanders to be rare for the following reasons: (1) the species' limited range in the action area reduces the likelihood of Program activities occurring in California tiger salamander habitat, (2) California tiger salamanders may not occur at every project site within its range in the County, (3) the NRCS proposes seasonal work restrictions,

(4) vernal pools, a primary habitat of the species, are outside the scope of the Program, (5) the NRCS proposes to avoid rodent burrows to the maximum extent practicable, and (6) Service-approved individuals should be effective in minimizing wounding or killing as a result of Program activities.

It is difficult to determine the effects that the temporary disturbance of 8 acres would have on the California tiger salamander, because the species uses a variety of different habitats in different spatial arrangements throughout a rain cycle. Disturbance of 8 acres of ponded habitat, which can support a high density of individuals, would have a much higher level of impact than disturbance of 8 acres of upland, dispersal habitat. That said, it is plausible that Program activity could disturb California tiger salamander homeranges to the extent that essential behavioral patterns are significantly impaired, and it is impossible to determine in advance, the minimum extent of habitat alteration that would cause harm of a particular individual. Therefore, we anticipate that Program activities would change the composition of an average of one California tiger salamander homerange annually, making the area less appealing for the species and causing harm of one individual. Accordingly, we expect harm of 5 California tiger salamanders over the duration of the Program.

Given the difficulty in detecting take of California tiger salamanders, and the infrequency with which projects are likely to occur in the species' habitat, the collective amount of incidental take of California tiger salamanders via harassment, harm, wounding, or killing that we anticipate as a result of Program activities is 2 individuals per year over the 5-year term of the Program. The temporary disturbance of 8 acres of the species' habitat (including upland within 2 miles of a suitable breeding pond) is a surrogate indicator that our anticipated annual level of take has been reached. Our anticipated take of California tiger salamanders takes into strong consideration that the NRCS will be able to avoid all but a few small rodent burrows in California tiger salamander habitat.

If any egg masses, tadpoles, or larvae of the California tiger salamander are found injured or dead and the cause can be linked to Program activities, the NRCS must contact the Service to determine whether formal consultation should be re-initiated. Program activities that could cause take should cease until consultation is completed.

Incidental Take of the Vernal Pool Fairy Shrimp and Longhorn Fairy Shrimp

We expect that vernal pool fairy shrimp and longhorn fairy shrimp could occur in any suitable habitat in the eastern valleys and plains of the County from the Carrizo Plain, north and northeast to the vicinity of the City of Paso Robles and the borders with Monterey and Kern Counties.

Incidental take of vernal pool fairy shrimp or longhorn fairy shrimp will be extremely difficult to detect because of their small body size, and finding a dead or injured specimen is unlikely. The NRCS proposes to avoid natural vernal pools and to avoid

altering the hydrologic processes that support natural vernal pools. However, vernal pools can be difficult to correctly identify, and fully avoiding all impacts to natural vernal pool habitat may be unrealistic. Therefore, we anticipate that a very small number of vernal pools may be adversely affected by Program activities, and any lifestage of vernal pool fairy shrimp or longhorn fairy shrimp within vernal pools may be harmed, wounded, or killed as a result of proposed project activities.

Vernal pool fairy shrimp and longhorn fairy shrimp may also occur in non-traditional or artificial wetland features (e.g., stock ponds) that provide suitable habitat and hydroperiod for the species. Under the Program, these features could be constructed, maintained, or modified, and fairy shrimp in these habitat features would be taken by these activities. The NRCS proposes measures to minimize effects to these species including working when the soil is dry to the extent possible; refilling and restoring excavations to their original grade; and saving and replacing the uppermost layer of soil, which may contain fairy shrimp cysts. These measures would reduce lethal take of fairy shrimp cysts; however, we anticipate that a subset of all lifestages of vernal pool fairy shrimp or longhorn fairy shrimp that occupy an artificial wetland feature in the action area may be harmed, wounded, or killed as a result of proposed project activities. We generally expect the effects of the Program to be temporary; however, if Program activities alter the hydrology of an occupied wetland, such that the hydroperiod is no longer suitable for either species, the fairy shrimp population(s) in that wetland would likely be lost.

We determined that 9 of the 18 proposed practices could affect potential fairy shrimp habitat (Appendix 2). These practices could result in wounding or killing of fairy shrimp if implemented in occupied habitat. The NRCS estimates (Table 1) show that these 9 practices could disturb a maximum of 73 acres annually. However, we anticipate a much lower disturbance potential from the Program, because (1) it is unlikely that all 9 practices would occur in the species' habitat in the same year, (2) it is unlikely that all practices would occur at the maximum disturbance level, (3) the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas, and (4) 56 of the 73 acres of estimated disturbance would be caused by invasive plant removal and cross fencing; both of these practices are unlikely to disturb fairy shrimp habitat if the NRCS' minimization measures are implemented correctly. Therefore, we anticipate the Program activities will disturb an average of 3.4 acres ((73 acres – 56 acres) / 5 years) of potential fairy shrimp habitat annually and 17 acres over the duration of the Program. This includes disturbance to natural and non-traditional seasonal wetlands suitable for vernal pool fairy shrimp and longhorn fairy shrimp. The temporary disturbance of 3.4 acres of the species' habitat is a surrogate indicator that our anticipated annual level of take has been reached.

Incidental Take of the San Joaquin Kit Fox

In the action area, San Joaquin kit fox numbers are strongest in the southeastern part of the County in and near the Carrizo Plain. The species is also known from the Cuyama Valley, the northeast corner of the County, as well as areas around Camp Roberts and the City of Paso Robles. We anticipate that the San Joaquin kit fox could occur in any suitable habitat (including agricultural fields) in the eastern foothills and plains of the County from the Cuyama Valley to the Carrizo Plain and north and northeast to the vicinity of the City of Paso Robles and the borders with Monterey and Kern Counties.

We anticipate that some of the proposed upland practices would occur in previously disturbed areas (e.g., pond maintenance, road improvements, etc.) and would not further disturb intact San Joaquin kit fox habitat but could affect San Joaquin kit foxes as the foxes react to presence of humans, vehicles, and construction equipment. We expect the NRCS' EPMs (e.g., surveys, monitoring, and avoidance measures; limits on disturbance area; restricting work activities to daylight hours; etc.) to prevent these practices from causing take of the San Joaquin kit fox.

We do not anticipate any San Joaquin kit foxes would be wounded or killed as a result of Program activities. If any San Joaquin kit foxes are found injured or dead and the cause can be linked to Program activities, the NRCS must contact the Service to determine whether formal consultation should be re-initiated. Program activities that could cause take should cease until consultation is completed.

We expect take of San Joaquin kit foxes to be rare for the following reasons: (1) the species has a limited distribution in the action area and is uncommon to absent in most suitable habitat, reducing the likelihood that Program activities would occur in occupied habitat, (2) San Joaquin kit foxes are unlikely to occur at every project site within the species' range in the action area, (3) we expect the impacts to San Joaquin kit foxes from Program practices to be temporary, (4) the NRCS proposes seasonal work restrictions to minimize impacts, (5) the largest of the 14 practice footprints (18 acres, cross fencing) proposed by the NRCS is a small percentage of even a small kit fox territory, and (6) Service-approved individuals should be effective in minimizing adverse effects as a result of Program activities. In addition, as described in the accompanying biological opinion, we expect San Joaquin kit fox homeranges in the action area to approach or exceed 3,840 acres.

We determined that 14 of the 18 proposed practices could affect potential San Joaquin kit fox habitat (Appendix 2). The NRCS estimates show that these 14 practices could disturb a maximum of 72 acres annually; however, it is unlikely that all 14 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas or would not cause the type of disturbance that would preclude the species from using the project area (e.g., Cross Fencing). Therefore, considering the species' relatively limited range in the

action area and the NRCS' proposed minimization measures, we anticipate the Program will cause disturbance of an average of 14 acres of potential San Joaquin kit fox habitat annually and 72 acres over the duration of the Program.

Fourteen acres and 72 acres equal 0.36 percent and 1.9 percent of 3,840 acres respectively, and it is unlikely that this small amount of habitat disturbance would cause significant habitat modification or degradation resulting in death or injury of a kit fox by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Even so, it is impossible to determine in advance, the minimum extent of habitat alteration that would cause harm of a particular San Joaquin kit fox. Therefore, over the 5-year term of the Program, we expect Program activities to change the composition of one San Joaquin kit fox territory to the extent that one individual is harmed. We also anticipate the NRCS will intentionally manipulate one kit fox den as part of the 72 acres of disturbance over the 5-year term of the Program. Manipulation of a den would be a surrogate indicator that a San Joaquin kit fox has been harassed. Incidental take of a kit fox by harassment or harm will be nearly impossible to observe. Therefore, disturbance of 72 acres of kit fox habitat is a surrogate indicator that one San Joaquin kit fox has been harassed and one has been harmed. We based this take level on (1) the species occupying a restricted range within the action area, (2) our expectation that Program activities will occur infrequently within occupied San Joaquin kit fox habitat, and (3) incidental take via harassment being difficult to identify and document.

Incidental Take of the Giant Kangaroo Rat

In the action area, we consider the giant kangaroo rat extant in the San Juan Creek Valley, the Carrizo Plain, and the Cuyama Valley along the southeastern Santa Barbara-San Luis Obispo County line. With the exception of agricultural and developed areas, we expect the giant kangaroo rat and the San Joaquin kit fox to occupy a similar range in the action area, because the two species are ecologically linked.

We do not expect giant kangaroo rats to be wounded or killed by Program activities. If any giant kangaroo rats are found injured or dead and the cause can be linked to Program activities, the NRCS must contact the Service to determine whether formal consultation should be re-initiated. Program activities that could cause take should cease until consultation is completed.

We determined that 8 of the 18 Program practices could affect potential giant kangaroo rat habitat (Appendix 2). The NRCS estimates (Table 1) show that these 8 practices could disturb a maximum of 51 acres annually; however, it is unlikely that all 8 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas. Therefore, we anticipate the NRCS will disturb an average of 10 acres of potential giant kangaroo rat habitat annually and 51 acres over the duration of the Program. We anticipate two

of these acres will be semi-permanently lost to practices such as filter strips and pond construction over the 5 year term of the Program.

Giant kangaroo rat homeranges are estimated to be only as large as 1,300 square yards (0.27 acre) (Braun 1985, Cooper and Randall 2007). The smallest footprint for the 8 Program practices that could affect giant kangaroo rat habitat is 0.1 acre (Underground Outlet) and all others are greater than 0.25 acre. Therefore, all eight practices have footprints that could disturb most or all of a giant kangaroo rat homerange and cause harm to one or more giant kangaroo rats. The NRCS has proposed measures that should avoid ground disturbance in active giant kangaroo rat habitat and thereby prevent incidental take via harm from occurring. However, homerange models are estimates and do not describe the actual limits of an individual's homerange. In addition, it is impossible to determine in advance, the minimum extent of habitat alteration that would cause harm of a particular giant kangaroo rat. Therefore, it is plausible that some Program activity could disturb a portion of a giant kangaroo rat homerange. Over the 5-year term of the Program, we expect Program activities to change the composition of two giant kangaroo rat territories, causing harm of two individuals.

Several of the proposed upland practices (e.g., Pond Improvements, Access Road Improvements, etc.) would not further disturb intact giant kangaroo rat habitat but could affect individuals as they react to project activities. We expect that some giant kangaroo rats within auditory and visual range of a project area may experience a startle response during project activities. Although a typical project would occur over a relatively short period of time, repeated exposure to noise, vibration, and other anthropogenic stressors could result in harassment of affected giant kangaroo rats. Harassment would be nearly impossible to observe as giant kangaroo rats are nocturnal and would be underground during project activities. If a Service-approved individual observes a giant kangaroo rat exit a burrow during project activities and depart away from the project area, we would assume that the individual has done so to distance itself from the project activities and harassment has occurred. While we expect the avoidance buffers and other minimization measures proposed by the NRCS to minimize the likelihood of harassment, two individual giant kangaroo rats may be incidentally taken via harassment.

We expect harassment and harm of giant kangaroo rats to be rare, because (1) the species occupies a limited range within the action area, (2) we expect the impacts to giant kangaroo rat habitat to be almost exclusively temporary, (3) we do not expect all eight practices to occur in the species' habitat in the same year or as part of the same project, (4) many of the NRCS' practice disturbance limits overestimate loss of habitat by including previously degraded habitat that would not support giant kangaroo rats (e.g., critical area planting, filter strip), and (5) the NRCS proposed measures to avoid impacts to occupied giant kangaroo rat habitat and minimize impacts to habitat that could support the species in the future.

Disturbance of 51 acres of giant kangaroo rat habitat over the duration of the Program would be a surrogate indicator that two giant kangaroo rats have been harassed and two have been harmed, and that our anticipated limit of incidental take has been reached. We based this take level on (1)

the species occupying a relatively restricted range within the action area, (2) our expectation that Program activities will occur infrequently within occupied giant kangaroo rat habitat, and (3) incidental take via harassment and harm being difficult to identify and document.

Incidental Take of the Blunt-nosed Leopard Lizard

In the action area, we consider the blunt-nosed leopard lizard extant in and around the San Juan Creek Valley, the Carrizo Plain, and the Cuyama Valley along the San Luis Obispo-Santa Barbara County line, because there are many occurrence records of the species in these areas. We also expect the species to be present within habitat corridors between these areas. With some exceptions, we expect the blunt-nosed leopard lizard and the giant kangaroo rat to occupy a similar range, because the two species are ecologically linked.

We do not expect blunt-nosed leopard lizards to be wounded or killed by Program activities. If any blunt-nosed leopard lizards are found injured or dead and the cause can be linked to Program activities, the NRCS must contact the Service to determine whether formal consultation should be re-initiated. Program activities that could cause take should cease until consultation is completed.

We determined that 8 of the 18 Program practices could affect potential blunt-nosed leopard lizard habitat (Appendix 2). The NRCS estimates (Table 1) show that these 8 practices could disturb a maximum of 51 acres annually; however, it is unlikely that all 8 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas. Therefore, we anticipate the NRCS will disturb an average of 10 acres of potential blunt-nosed leopard lizard habitat annually and 51 acres over the duration of the Program. We anticipate two of these acres will be semi-permanently lost to practices such as filter strips and pond construction over the 5 year term of the Program.

Blunt-nosed leopard lizard homeranges can exceed 20 acres, although average homerange size is 10.5 acres for males and 6 acres for females (Warrick et al. 1998). The smallest footprint for the 8 Program practices that could affect blunt-nosed leopard lizard habitat is 0.1 acre (Underground Outlet) and is small enough that it may not adversely affect a resident blunt-nosed leopard lizard. However, other activities such as cross fencing or critical area planting could affect most or all of a blunt-nosed leopard lizard homerange and cause harm to one or more resident individuals. The NRCS has proposed measures that should minimize ground disturbance in occupied blunt-nosed leopard lizard habitat and thereby reduce the chance of incidental take via harm. However, homerange models are estimates and do not describe the actual limits of an individual's homerange. Therefore, it is plausible that some Program activities could disturb a portion of a blunt-nosed leopard lizard homerange. In addition, it is impossible to determine in advance, the minimum extent of habitat alteration that would cause harm of a particular blunt-nosed leopard

lizard. Over the 5-year term of the Program, we expect Program activities to change the composition of two blunt-nosed leopard lizard territories, causing harm to two individuals.

Several of the proposed upland practices (e.g., Pond Improvements, Access Road Improvements, etc.) would not further disturb intact blunt-nosed leopard lizard habitat but could affect individuals as they react to project activities. This is in addition to any indirect effects to individuals caused by the 8 practices that could affect potential blunt-nosed leopard lizard habitat. We expect that some blunt-nosed leopard lizards within visual range of a project area may experience a startle response during project activities. Other blunt-nosed leopard lizards may be "herded" away from Program activities, per the NRCS' proposed minimization measures. Although a typical project would occur over a relatively short period of time, repeated exposure to anthropogenic stressors could result in harassment of affected blunt-nosed leopard lizards. Harassment would be nearly impossible to observe as blunt-nosed leopard lizards semi-fossorial and could be underground during project activities. If a blunt-nosed leopard lizard is observed exiting a burrow during project activities and departing away from the project area, we would assume that the individual has done so to distance itself from the project activities and harassment has occurred. While we expect the avoidance buffers and other minimization measures proposed by the NRCS to minimize the likelihood of harassment, two individual blunt-nosed leopard lizards may be incidentally taken via harassment.

We expect harassment and harm of blunt-nosed leopard lizards to be rare, because (1) the species occupies a limited range within the action area, (2) we expect the impacts to blunt-nosed leopard lizard habitat to be almost exclusively temporary, (3) we do not expect all eight practices to occur in the species' habitat in the same year or as part of the same project, (4) many of the NRCS' practice disturbance limits overestimate loss of habitat by including previously degraded habitat that would not support blunt-nosed leopard lizards (e.g., critical area planting, filter strip), and (5) the NRCS proposed measures to avoid impacts to occupied blunt-nosed leopard lizard habitat and minimize impacts to habitat that could support the species in the future.

Disturbance of 51 acres of blunt-nosed leopard lizard habitat over the duration of the Program would be a surrogate indicator that two blunt-nosed leopard lizards have been harassed and two have been harmed, and that our anticipated limit of incidental take has been reached. We based this take level on (1) the species occupying a relatively restricted range within the action area, (2) our expectation that Program activities will occur infrequently within occupied blunt-nosed leopard lizard habitat, and (3) incidental take via harassment and harm being difficult to identify and document.

Incidental Take of the Least Bell's Vireo

In the action area, least Bell's vireos are known to occur in riparian habitat along the Salinas River and Santa Maria River watershed. However, the least Bell's vireo has been expanding its range in recent years and could occur in any suitable habitat within the action area. We expect

the NRCS' EPMs (e.g., seasonal work restrictions; surveys, monitoring, and avoidance measures; limits on disturbance area; etc.) to largely preclude incidental take of the least Bell's vireo.

We do not anticipate any least Bell's vireos would be harassed, wounded, or killed as a result of Program activities. If any least Bell's vireos are found injured or dead and the cause can be linked to Program activities, the NRCS must contact the Service to determine whether formal consultation should be re-initiated. Program activities that could cause take should cease until consultation is completed.

We determined that 9 of the 18 proposed practices could affect potential least Bell's vireo habitat (Appendix 2). The NRCS estimates show that these 9 practices could disturb a maximum of 41 acres annually; however, it is unlikely that all 9 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas or would not cause the type of disturbance that would preclude the species from using the project area (e.g., Invasives Removal, Stream Bank Protection). Therefore, considering the species' relatively limited known range in the action area and the NRCS' proposed minimization measures, we anticipate the Program will cause disturbance of an average of 8 acres of potential least Bell's vireo habitat (including non-native plant species suitable as foraging habitat) annually and 41 acres over the duration of the Program.

We acknowledge that this species breeds in an inherently dynamic ecosystem and changes to habitat structure within existing territories happen naturally. Further, removal of non-native plant species from least Bell's vireo habitat would have long-term benefits for the species. Therefore, it is reasonable to conclude that not all habitat removal would equate to significant habitat modification or degradation resulting in death or injury to least Bell's vireos by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. However, it is impossible to determine, in advance, the minimum extent of habitat alteration that would cause harm of a particular individual or pair of least Bell's vireos. Any change in the composition of a territory's structure could make the area less appealing to returning least Bell's vireos, and we consider the loss of habitat within a known territory an adverse effect. Removal of non-native vegetation can also be considered an adverse effect if it alters the vegetation structure of a known territory.

Based on documented homerange sizes for the least Bell's vireo, removal of 8 acres of occupied habitat could adversely affect as many as 16 individuals. We do not expect this "maximum disturbance" scenario during implementation of the program, because (1) we do not expect all 9 of these practices to occur in the same year or as part of the same project, (2) the least Bell's vireo is known to occur in a limited range in the action area, (3) some of the NRCS' practice disturbance limits overestimate loss of habitat by including previously degraded habitat that would not support least Bell's vireos (e.g., bank stabilization), and (4) the species breeds in an

inherently dynamic ecosystem and changes to habitat structure within existing territories happen naturally. Therefore, we anticipate that one least Bell's vireo would be adversely affected to the point of harm annually by Program activities. The loss of 8 acres suitable habitat would be a surrogate indication that 1 least Bell's vireo has been harmed. We based this take level on (1) the species occupying a restricted but expanding range within the action area, (2) our expectation that Program activities will occur infrequently within occupied least Bell's vireo habitat, and (3) incidental take via harm being difficult to identify and document.

Incidental Take of the Morro Shoulderband Snail

The species' is currently known to occur throughout Los Osos area to just north of Morro Bay, in the coastal dune scrub habitat that provides shelter in leaf litter and on the undersides of plants, especially mock heather. However, Morro shoulderband snails also have been documented in relatively high densities in locations that are seemingly unsuitable for the species. We expect Morro shoulderband snails to be taken only in the portions of the species' range that are not in dunes or the coastal strand, as these areas are outside the scope of the Program.

We determined that 5 of the 18 proposed practices could affect potential Morro shoulderband snail habitat (Appendix 2). The NRCS estimates show that these 5 practices could disturb a maximum of 26 acres; however, it is unlikely that all 5 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas or would not cause the type of disturbance that would preclude the species from using the project area (e.g., removal of certain invasive plant species, which comprises 77 percent of the 26 acre disturbance potential). Therefore, considering the species' extremely limited range in the action area and the NRCS' proposed minimization measures, we anticipate the Program will cause disturbance of an average of 2.2 acres of potential Morro shoulderband snail habitat (including non-native plant species suitable as foraging habitat) annually and 11 acres over the duration of the Program. We expect the vast majority of this disturbance to be caused during removal of invasive plant species and ultimately to be beneficial for the species. We expect that one Morro shoulderband snail would be harassed or harmed in each acre of occupied habitat that is disturbed by Program activities.

Based on the survey results reported in Service (2013), we expect approximately 110 Morro shoulderband snails to occur in the 2.2 acres of habitat disturbed annually by Program activities, and we anticipate that all Morro shoulderband snails found within the action area would be subject to take by capture. Although capture and relocation is intended to reduce the likelihood of injury or death to Morro shoulderband snails from Program activities, a subset of individuals may be wounded or killed as a result of capture and being moved to potentially unfamiliar habitat. Morro shoulderband snails have a cryptic coloration and can be difficult to observe during surveys. Any Morro shoulderband snails that remain in the project area may be crushed, entombed, or subject to increased predation during Program activities. The NRCS' proposal to

employ a Service-approved individual to conduct any surveys, capture, and relocation will greatly reduce the chance of injury or death of captured individuals.

We expect approximately 110 Morro shoulderband snails to occur in the 2.2 acres of habitat disturbed annually by Program activities. We anticipate that an average of 5 percent (5 snails) of adult or juvenile Morro shoulderband snails will be wounded or killed annually during capture and relocation efforts or by Program activities that disturb occupied habitat. This is in addition to the one Morro shoulderband snail we expect to be harassed or harmed in each acre of occupied habitat that is disturbed.

Incidental take of this species can be difficult to detect because of the species' small body size and finding dead or injured specimens is unlikely. Therefore, disturbance of 11 acres of Morro shoulderband snail habitat over the duration of the Program is a surrogate indicator that 36 Morro shoulderband snails have been harassed, harmed, wounded, or killed (5 snails wounded or killed annually, and 2.2 harassed or harmed annually) and our anticipated take limit has been reached. We based this take limit on (1) the species occupying a restricted range within the action area, (2) our expectation that Program activities will occur infrequently within occupied Morro shoulderband snail habitat, (3) our expectation that Service-approved individuals should be effective in minimizing wounding or killing as a result of Program activities, and (4) incidental take of this species will be difficult to identify and document, and an observation of incidental take likely indicates that additional, unobserved incidental take has occurred.

Incidental Take of the Tidewater Goby

The tidewater goby occurs primarily in estuaries, sloughs, and lagoons but can occur several miles upstream of these habitats. Within the action area, the species occupies approximately 21 localities of brackish habitat in rivers, creeks, estuaries, sloughs, etc. from Arroyo del Corral in northern San Luis Obispo County to the Santa Maria River estuary at the border with Santa Barbara County (Service 2005b). The NRCS' proposal to prohibit work in estuaries, sloughs, and lagoons should avoid direct impacts to all life stages of tidewater goby in these habitats. Tidewater gobies in these habitats may be indirectly impacted by sediment or other contaminants introduced to the upstream water column during Program activities; however, because the NRCS would implement measures to minimize sediment or other inputs to the water column, we do not expect the Program to cause adverse effects to tidewater gobies in estuaries, sloughs, or lagoons. Tidewater gobies occurring in a project area could be harassed, harmed, captured, wounded, or killed by Program activities.

We anticipate that all tidewater gobies observed in harm's way in a project site are subject to capture and relocation. The NRCS anticipates that a maximum of five projects annually would require capture and relocation of tidewater gobies during dewatering of a water body. Capture and relocation is intended to reduce the likelihood of injury or death as a result of project activities; however, the tidewater goby's small, delicate body is susceptible to injury during capture and relocation. If relocated individuals attempt to return to the point of capture, they

may be subject to multiple captures, increased predation, and increased chance of injury. Any tidewater gobies that evade detection, capture, and relocation, and remain in a project area may be desiccated; crushed by construction equipment, vehicles, or foot traffic; or may be otherwise wounded or killed during project activities. The NRCS' proposal to employ a Service-approved individual to conduct survey, capture, and relocation should minimize the risk of injury or death associated with survey, capture, and relocation.

We determined that 8 of the 18 proposed practices could affect potential tidewater goby habitat (Appendix 2). The NRCS estimates show that these 8 practices could disturb a maximum of 19 acres annually; however, it is unlikely that all 8 practices would occur in the species' habitat in the same year and that all practices would occur at the maximum disturbance level. In addition, the figures in Table 1 overestimate potential habitat disturbance, because much of the disturbance caused by Program practices would occur in previously disturbed areas or would not cause the type of disturbance that would preclude the species from using the project area (e.g., Stream Bank Protection). Therefore, considering the species' limited range in the action area and the NRCS' proposed minimization measures, we anticipate the Program will cause disturbance of an average of 2 acres of tidewater goby habitat annually and 10 acres over the duration of the Program. This estimate takes into account the Stream Bank Protection practice, which comprises 10 of the 19 acres of potential disturbance, and would primarily affect a stream bank rather than the active water channel where tidewater gobies could occur.

The NRCS did not provide quantitative estimates of sediment loads that would be introduced to a water body by each practice. Therefore, it is possible that each project that occurs in, or introduces sediment to, occupied tidewater goby habitat could cause harm to a portion of the tidewater goby population in that water body. However, we expect take of tidewater gobies via harm to be rare because (1) the NRCS will prohibit work in the primary habitat of tidewater gobies, (2) the disturbance footprints of the proposed practices are relatively small and we do not expect substantial sedimentation as a result of Program activities, (3) sedimentation caused by winter rains after project completion will likely be indistinguishable from those effects caused by other, larger sediment loads from elsewhere in a watershed, and (4) tidewater goby habitat is inherently variable and naturally receives sediment deposits from upstream sources.

Tidewater gobies can occur in extremely high densities, and due to their small size and the murky nature of their habitat, it can be difficult to locate and capture all of them during dewatering of a project area. We expect that some tidewater gobies will not be captured and relocated and will be crushed, buried, dehydrated, or otherwise wounded or killed during project activities. Given the NRCS' estimate that 5 projects could dewater tidewater goby habitat annually, and our expectation that 8 practices could result in take of tidewater gobies annually, we expect the Program to annually affect 5 tidewater goby populations upstream of estuaries, sloughs, or lagoons. Given the possibility of dense populations, the difficulty in detecting take of tidewater gobies, and the relatively small size of the proposed practices, the maximum amount of incidental take of tidewater gobies via wounding or mortality that may occur as a result of Program project activities is 10 individuals per year and 50 individuals over the 5-year term of

the Program. Given our expectation that take via harm will be rare, harm of tidewater gobies in one population upstream of an estuary, slough, or lagoon may occur annually as a result of Program activities. Because of the difficulty in documenting take of this species, disturbance of 10 acres of tidewater goby habitat over the duration of the Program is a surrogate indicator that our anticipated take limit has been reached.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, or tidewater goby. This incidental take statement does not exempt any activity from the prohibitions against take contained in section 9 of the Act that is not incidental to the action as described in this biological opinion. California red-legged frogs, California tiger salamanders, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit foxes, giant kangaroo rats, blunt-nosed leopard lizards, least Bell's vireos, Morro shoulderband snails, and tidewater gobies may be taken only within the defined boundaries of the action area as described in the Environmental Baseline section of the biological opinion.

REASONABLE AND PRUDENT MEASURES

The Service's evaluation of the effects of the proposed action includes consideration of the measures developed by the NRCS and repeated in the Description of the Proposed Action portion of this biological opinion to reduce the adverse effects of Program activities on listed species. Any subsequent changes in the minimization measures proposed by the NRCS may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR 402.16. Reasonable and prudent measures are intended to supplement the protective measures that were proposed by the NRCS as part of the proposed action.

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, least Bell's vireo, Morro shoulderband snail, and tidewater goby during activities conducted under the San Luis Obispo County Partners in Restoration Permit Coordination Program:

1. Individuals must be authorized by the Service before they survey for, capture, and/or relocate listed species.
2. Take of listed species during Program activities must be reduced through well-defined operational procedures, and by timing work activities appropriately, with the cooperation of a Service-approved individual.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the NRCS must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure 1:

    a. The NRCS must request our approval of any individual the NRCS wishes to employ to survey for listed species.
    b. Per the project description and the analysis in the accompanying biological opinion, only California red-legged frogs, California tiger salamanders, Morro shoulderband snails, and tidewater gobies are subject to capture and relocation. The NRCS must employ only Service-approved individuals to survey for, capture, and relocate listed species.
    c. Service-approved individuals will record all pertinent information when relocating listed species including the number of individuals captured, site of capture, site of relocation, habitat at capture, and activity for which the relocation was implemented.
    d. Only Service-approved individuals may monitor and manipulate San Joaquin kit fox dens.
    e. Requests for approval of an individual should include the person's qualifications to conduct the requested activities and must be made in writing to the Service's Ventura Fish and Wildlife Office at least 30 days, preferably 45 days, before the individual would conduct any of these activities. Please be advised that possession of a 10(a)(1)(A) permit for the covered species does not substitute for the implementation of this measure. Authorization of Service-approved individuals is valid for this Program only. As of the issuance date of this biological opinion, the Service has not approved any individuals for the Program.

2. The following terms and conditions implement reasonable and prudent measure 2:

    a. During the planning process as described in the Description of the Proposed Action section of this biological opinion, prior to the onset of any ground-disturbing activity within or adjacent to listed species habitat, a Service-approved individual must survey the potential project area according to the Service's Survey and Protocol Guidelines (available on our website at http://www.fws.gov/ventura/species_information/protocols_guidelines/). Please note that single-season absence of California tiger salamanders from a pool/pond does not equate to non-use by the species, as individuals can remain in burrows for multiple seasons before returning to aquatic habitat. We recognize that the NRCS may assume that some habitat is occupied by one or more listed species, and protocol level surveys would not be completed in those instances.

b. To the extent possible, the NRCS will plan projects to avoid concentrating livestock in an area occupied by any of the species covered in the accompanying biological opinion.
c. During the San Joaquin kit fox mating/breeding/pupping season, which occurs from December through August, project activities in kit fox habitat may only occur between one hour after sunrise and one hour before sunset.
d. San Joaquin kit fox dens may be intentionally manipulated only during the species' non-breeding/non-pupping season (September through November).
e. Projects that would occur in occupied blunt-nosed leopard lizard habitat must be implemented when air temperatures are within the species optimal active range (74 to 104 degrees Fahrenheit), which generally occurs from March through August but can extend into October. This will maximize the ability of a Service-approved surveyor/monitor to observe resident blunt-nosed leopard lizards.
f. Prior to maintaining a pond, basin, or other wetted area that has not completely dried, the NRCS must ensure that a Service approved individual surveys the project area prior to ground disturbance. Please note that amphibians are known to use deep, moist cracks in the soil at the bottom of seemingly dry ponds/basins.
g. Captured California red-legged frogs, California tiger salamanders, Morro shoulderband snails, and tidewater gobies should be released in habitat similar to that from which they were captured and in a location out of harm's way as close as possible to the capture site. The relocation site must be in the same watershed/drainage as the capture location. Exceptions may be made on a case by case basis in coordination with the Service.
h. A Service-approved individual will monitor project activities until all capture and relocation of listed species, instruction of workers, and habitat disturbance have been completed and listed species are no longer at risk. After this time, the NRCS may designate a person to monitor on-site compliance with all minimization measures. The Service-approved individual will ensure that this on-site monitor receives training outlined above and in the identification of applicable listed species. The monitor and the Service-approved individual will have the authority to halt any action that might result in impacts that exceed the levels of take anticipated by the Service in this biological opinion. If work is stopped, the NRCS will notify the Service immediately.

REPORTING REQUIREMENTS

For each year this biological opinion is in effect, and as described in the BA and the project description of this biological opinion, the NRCS will provide a written annual report describing Program activities during the previous year to the Service by January 31. In addition to the report contents described in the BA, the reports must contain information on (1) the type of activities that occurred in each project area (e.g., construction activities, monitoring, etc.), (2) the location of these activities, (3) a description of the habitat in which these activities occurred, (4) the number of listed species affected, (5) steps taken to avoid or minimize effects, (6) the number

of individuals of any federally listed species covered by this biological opinion captured and relocated, (7) the locations from which federally listed species were moved and areas to which they were relocated, (8) geographic coordinates for any federally listed species encountered, and (9) a record of observations of any other listed species observed during Program activities. The first report will be due January 31st following the first Program activities conducted pursuant to this biological opinion.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Upon locating any dead or injured California red-legged frogs, California tiger salamanders, vernal pool fairy shrimp, longhorn fairy shrimp, San Joaquin kit foxes, giant kangaroo rats, blunt-nosed leopard lizards, least Bell's vireos, Morro shoulderband snails, or tidewater gobies, initial notification must be made by telephone and writing to the Ventura Fish and Wildlife Office in Ventura, California, (2493 Portola Road, Suite B, Ventura, California 93003, (805) 644-1766) within 3 working days of the finding. The report must include the date, time, location of the carcass, a photograph, cause of death if known, and any other pertinent information.

The NRCS must take care in handling dead specimens to preserve biological material in the best possible state for later analysis. Should any injured listed species survive, the NRCS should contact us regarding their final disposition.

Any remains of dead, intact California red-legged frogs, California tiger salamanders, and blunt-nosed leopard lizards must be placed with the California Academy of Sciences Herpetology Department (Contact: Jens Vindum, California Academy of Sciences Herpetology Department, 875 Howard Street, San Francisco, California, 94103 (415) 321-8289). Arrangements regarding the disposition of potential museum specimens must be made with a receiving institution prior to the implementation of any fieldwork. Other arrangements for disposition of specimens may be made with prior written approval from the Service.

Any remains of dead, intact San Joaquin kit foxes, giant kangaroo rats, or least Bell's vireos must be placed with the California Academy of Sciences Ornithology and Mammalogy Department (Contact: John Dumbacher, Chairman, California Academy of Sciences Ornithology and Mammalogy Department, 875 Howard Street, San Francisco, California, 94103 (415) 321-8369). Arrangements regarding the disposition of potential museum specimens must be made with a receiving institution prior to the implementation of any fieldwork. Other arrangements for disposition of specimens may be made with prior written approval from the Service.

Any remains of dead, intact Morro shoulderband snails must be deposited at a professionally maintained facility that is widely accessible for scientific study, such as the California Academy of Sciences [Entomology Department, Golden Gate Park, San Francisco, California 94118, (415) 750-7037 and 7239] or the Santa Barbara Museum of Natural History [Department of Invertebrates, 2559 Puesta del Sol Road, Santa Barbara, California 93105, (805) 682-4711].

Arrangements regarding the disposition of potential museum specimens must be made with a receiving institution prior to the implementation of any fieldwork. Other arrangements for disposition of specimens may be made with prior written approval from the Service.

Any remains of dead, intact tidewater gobies must be placed with the Department of Biology (OBEE), University of California at Los Angeles, 621 Young Drive South, Los Angeles, California, 90095-1606 (Attn: David K. Jacobs, Ph.D. (310) 206-7885). Arrangements regarding the disposition of potential museum specimens must be made with a receiving institution prior to the implementation of any fieldwork. Other arrangements for disposition of specimens may be made with prior written approval from the Service.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use 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.

1. Service-approved biologists should permanently remove, from within the project areas, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes, to the maximum extent possible. The Service-approved biologists will have the responsibility of ensuring that their activities are in compliance with the California Fish and Game Code.
2. The NRCS should monitor the effectiveness of the implementation of plant protection and habitat enhancement measures designed to minimize adverse effects to individuals and to benefit populations of listed plant species.
3. The NRCS should encourage and facilitate landowner use of owl boxes to manage rodents and reduce the amount of poison on their property.
4. The NRCS should encourage landowners to manage ponds for successful co-use by listed species and livestock. This could include fencing off segments of livestock ponds to provide amphibians and other wildlife a refuge from livestock impacts while maintaining access for livestock.

We request notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects, or benefitting listed species and their habitats.

REINITIATION NOTICE

This concludes formal consultation on the San Luis Obispo County Partners in Restoration Permit Coordination Program. As provided in 50 CFR §402.16, reinitiation 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 not considered in this 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, the exemption issued pursuant to section 7(o)(2) will have lapsed and any further take would be a violation of section 4(d) or 9(a)(1)(B). Consequently, we recommend that any operations causing such take cease pending reinitiation. Additionally, as proposed in the Description of the Proposed Action section of the biological opinion, if the NRCS intends to extend the Program, reinitiation of formal consultation should be requested within 5 years following the issuance of this biological opinion.

If you have any questions, please contact David Simmons of our staff at (805) 644-1766, extension 368.

Sincerely,

Stephen P. Henry
Acting Field Supervisor

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Appendix 1. Declining Amphibian Populations Task Force Fieldwork Code of Practice.

This code of practice was prepared by the Declining Amphibian Task Force (DAPTF) to provide guidelines for use by anyone conducting field work at amphibian breeding sites or in other aquatic habitats. Observations of diseased and parasite-infected amphibians are now being frequently reported from sites all over the world. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up unapparent infections of novel disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried in a variety of ways between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to novel localities containing species which have had little or no prior contact with such pathogens or parasites. Such occurrences may be implicated in some instances where amphibian populations have declined. Therefore, it is vitally important for those involved in amphibian research (and other wetland/pond studies including those on fish, invertebrates and plants) to take steps to minimize the spread of disease and parasites between study sites.

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires and all other surfaces. Rinse cleaned items with sterilized (e.g., boiled or treated) water before leaving each study site.

2. Boots, nets, traps, etc., should then be scrubbed with 70% ethanol solution (or sodium hypochlorite 3 to 6%) and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland.

3. In remote locations, clean all equipment as described above upon return to the lab or "base camp". Elsewhere, when washing machine facilities are available, remove nets from poles and wash with bleach on a "delicates" cycle, contained in a protective mesh laundry bag.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolates species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean and store them separately and the end of each field day.

5. When amphibians are collected, ensure the separation of animals from different sites and take great care to avoid indirect contact between them (e.g., via handling, reuse of containers) or with other captive animals. Isolation from un-sterilized plants or soils which have been taken from other sites is also essential. Always use disinfected/disposable husbandry equipment.

6. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

7. Used cleaning materials (liquids, etc.) should be disposed of safely and if necessary taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

Appendix 2. Estimated number of practices and disturbance by species. These figures are revised from Tables 6a and 6b of the BA based on input from NRCS. Where a practice is expected to affect a species, the corresponding annual disturbance estimate is in the cell under that species. Maximum disturbance estimates for each species appear in the bottom row.

Stream Practices	Practices/ year	Disturbance (acres)	Disturbance /year	CRLF	CTS	VPFS/ LHFS	SJKF	GKR	BNLL	LBV	MSS	TWG
Channel Stabilization	1	2	2	2			2			2		2
Grade Stabilization Structure	3	1.5	4.5	4.5	4.5		4.5			4.5		4.5
Debris Removal & Vegetation Management	4	0.05	0.2	0.2						0.2		0.2
Critical Area Planting - on stream bank	5	4	20		Occurs in previously disturbed habitat							
Pipeline (crossing a stream)	2	0.1	0.2	0.2						0.2		0.2
Pond Improvements	2	1.5	3	3	3	3						
Restoration & Management of Sensitive Habitats												
Invasives removal	4	5	20	20	20	20				20	20	
Stream Bank Protection	2	5	10	10			10			10		10
Stream Crossing	2	0.1	0.2	0.2						0.2		0.2
Stream Habitat Improvement & Management												
Barrier removal	1	0.5	0.5	0.5						0.5		0.5
Install habitat features	1	0.2	0.2	0.2						0.2		0.2
Plant riparian vegetation	2	1	2	2			2			2		
Structure for Water Control/Culvert	3	0.25	0.75	0.75			0.75			0.75		0.75
Upland Practices												
Access Road Improvements	3	15	45		Occurs in previously disturbed habitat							
Critical Area Planting (upland gullies)	1	4	4	4	4		4	4	4		4	
Diversion	2	1	2	2	2	2	2	2	2		2	
Filter Strip	3	2.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5			
Grassed Waterway	2	1	2	2	2	2	2					
Irrigation System & Tailwater Recovery	0.5	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25			
Pipeline (on rangeland)	3	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3			
Pond Improvements	1	1.5	1.5	1.5	1.5	1.5						
Restoration & Management of Sensitive Habitats			0									
Cross fencing*	2	18	36	36	36	36	36	36	36			
Pond construction	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5			
Sediment Basin	0.5	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25		0.25	
Underground Outlet	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1	
Totals	**20**		**99**	**98.0**	**81.9**	**73.4**	**72.2**	**50.9**	**50.9**	**40.6**	**26.4**	**18.6**

*Cross fencing disturbance calculated by multiplying NRCS' estimate maximum of 5 miles of fenceline by estimated disturbance width of 30 feet.