

# Friant Water Users Authority



## O & M Biological Opinion 2005



## United States Department of the Interior

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



IN REPLY REFER TO:  
1-1-04-F-0368

**FEB 17 2005**

### Memorandum

To: Area Office Manager, South Central California Area Office, Bureau of Reclamation, Fresno, California

From: Acting Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California  
*Kenneth Samaha*

Subject: Formal Endangered Species Consultation on the Operations and Maintenance Program Occurring on Bureau of Reclamation Lands within the South-Central California Area Office

This is in response to your May 5, 2004, request for reinitiating formal consultation with the U.S. Fish and Wildlife Service (Service) on the Operations and Maintenance (O&M) occurring on CVP facilities on Bureau of Reclamation lands within the South-Central California Area Office (SCCAO) in San Joaquin, Stanislaus, Merced, Madera, Fresno, Santa Clara, San Benito and Contra Costa Counties, California. Your request was received in our office on August 27, 2003. This document represents the Service's biological opinion on the effects of the proposed action on the California tiger salamander (*Ambystoma californiense*), vernal pool fairy shrimp (*Branchinecta lynchi*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), blunt-nosed leopard lizard (*Gambelia sila*), vernal pool tadpole shrimp (*Lepidurus packardii*), San Joaquin wooly-threads (*Monolopia congdonii*), California red-legged frog (*Rana aurora draytonii*), giant garter snake (*Thamnophis gigas*), San Joaquin kit fox (*Vulpes macrotis mutica*); and our conference opinion on the effects of the proposed action on proposed critical habitat for the California red-legged frog and California tiger salamander, in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act).

Service has concurred with Reclamation that the proposed action is not likely to adversely affect the Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), succulent owl's clover (*Castilleja campestris* var. *succulentus*) and its designated critical habitat, Hoover's spurge (*Chamaesyce hooveri*) and its designated critical habitat, giant kangaroo rat (*Dipodomys ingens*), California condor (*Gymnogyps californianus*), bald eagle (*Haliaeetus leucocephalus*), delta smelt (*Hypomesus transpacificus*), San Joaquin adobe sunburst (*Pseudobahia peirsonii*), California clapper rail (*Rallus longirostris obsoletus*), salt-marsh harvest

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Greene's tuctoria (*Tuctoria greenei*) and its critical habitat, San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*) and its designated critical habitat, and designated critical habitat for the vernal pool fairy shrimp and vernal pool tadpole shrimp.

Service understands that the proposed action has been determined by Reclamation to have no effect on the large-flowered fiddleneck (*Amsinckia grandiflora*), Lange's metalmark butterfly (*Apodemia mormo langei*), Aleutian Canada goose (*Branta canadensis leucopareia*), California jewelflower (*Caulanthus californicus*), soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*), palmate-bracted bird's-beak (*Cordylanthus palmatus*), Fresno kangaroo rat (*Dipodomys nitratooides exilis*), Contra Costa wallflower (*Erysimum capitatum* ssp. *angustatum*), Bay checkerspot butterfly (*Euphydryas editha bayensis*), Contra Costa goldfields (*Lasthenia conjugens*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), riparian (=San Joaquin Valley) woodrat (*Neotoma fuscipes riparia*), Antioch Dunes evening-primrose (*Oenothera deltooides* ssp. *howellii*), Bakersfield cactus (*Opuntia basilaris* var. *treleasei*), hairy Orcutt grass (*Orcuttia pilosa*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), Keck's checkerbloom (*Sidalcea keckii*), riparian brush rabbit (*Sylvilagus bachmani riparius*), and designated critical habitat for large-flowered fiddleneck, valley elderberry longhorn beetle, Fresno kangaroo rat, Contra Costa goldfields, Antioch Dunes evening primrose, and hairy Orcutt grass.

This biological and conference opinion addresses the effects of the continued routine operations and maintenance of the SCCAO for a period of 25 years. The Bureau of Reclamation (Reclamation) has developed the SCCAO Operation and Maintenance Plan (SCCAO O&M Plan) as a requirement of the Service's *Biological Opinion on Implementation of the CVPIA and Continued Operation and Maintenance of the Central Valley Project* (November, 2000, File Number 1-1-01-I-0311 – Service 2000). The SCCAO O&M Plan primarily consists of three documents: 1) the March 24, 2004, Operations and Maintenance Plan, which addresses the maintenance and operations activities; 2) the Integrated Pest Management Plan, which provides guidance for techniques used to control weeds and other pests on Reclamation land in and around SCCAO Central Valley Project (CVP) lands and facilities; and 3) the SCCAO Field Operations Manual, which is intended as a "guide" to be used in the field when conducting routine operations and maintenance activities by maintenance and resource staff. Procedures contained in these documents will be followed by all Reclamation employees, entities contracted to operate and maintain Reclamation facilities, and all parties that hold leases to Reclamation lands. Potential impacts of larger construction projects will be addressed by a separate environmental review.

The findings and recommendations in this consultation are based on: (1) the April 29, 2004, *O&M Plan for CVP Lands and Facilities Administered by U.S. Bureau of Reclamation South-Central California Area Office*; (2) the August 2003, *Field Operations Manual for the Protection of Endangered Species, Vehicle Version*; and (3) various electronic messages between Reclamation and the Service. A complete

administrative record of this consultation is on file in the Sacramento Fish & Wildlife Service Office (SFWO).

SFWO is the lead office for the U.S. Fish & Wildlife Service for all the species upon which Reclamation is consulting, as well as the office that issued the biological opinion on implementation of the Central Valley Project Improvement Act. This office is therefore the appropriate office for consultation for this project. It should be noted, however, that the Ventura office of the Fish & Wildlife Service is the office with regulatory responsibility for some of the counties in which SCCAO's CVP facilities are located (i.e. San Benito County).

### Consultation History

Consultation between Reclamation and Service is summarized below.

- October 15, 1991 – Friant Water Contract Renewals (1-1-91-F-22), San Joaquin kit fox, blunt-nosed leopard lizard, Fresno kangaroo rat, and other species (amended May 14, 1992, appended to 1-1-95-F-39 on February 27, 1998).
- February 12, 1993 – Long Term Operations Criteria and Plan for CVP Reservoirs (1-1-93-F-10), bald eagle, salt marsh harvest mouse, California clapper rail.
- May 23, 1993 – Operations Criteria and Plan (1-1-93-F-32), delta smelt.
- February 4, 1994 – 1994 Operations Criteria and Plan (1-1-94-F-2), delta smelt.
- December 27, 1994 – Interim Water Contract Renewal (1-1-94-69), San Joaquin kit fox, large-flowered fiddleneck, giant garter snake, vernal pool fairy shrimp, other species.
- February 23, 1995 – Amendment of December 27, 1994 Interim Water Contract Renewal Opinion to include critical needs planning (1-1-95-F-39).
- February 27, 1995 – Interim renewal of 67 water contracts of the CVP.
- March 6, 1995 – Long-term Operations Criteria and Plan (1-1-94-F-70), delta smelt, delta smelt critical habitat, Sacramento splittail (amended April 26, 1995 (1-1-95-I-804).
- April 26, 1996 – Temporary Barriers (1-1-96-F-53), delta smelt and delta smelt critical habitat.
- January 20, 1998 – Interim Water Contract Renewal Opinion amendment (1-1-98-I-383), San Joaquin kit fox, large-flowered fiddleneck, giant garter snake, vernal pool fairy shrimp, other species.
- February 27, 1998 – Re-initiation of Formal Endangered Species Consultation on the Supplemental Interim Renewal of Central Valley Project Water Contracts to include 14 Friant Water Contracts (1-1-98-I-595), San Joaquin kit fox, blunt-nosed leopard lizard, Fresno kangaroo rat, and other species.
- February 29, 2000–Interim Biological Opinion (1-1-F-0056), several species.

- March 24, 2000–California Toxics Rule (1-1-98-F-21), several species.
- January 19, 2001 - Friant Division and Cross Valley Canal Unit Contracts (Friant-Cross Valley Opinion, Service File No. 1-1-01-F-0027)
- February 28, 2001 – Memo 1-1-01-1-1211 extends the BO dated February 29, 2000. Some of the interim contracts are covered under Friant/Cross Valley BO dated January 20, 2001.
- September 27, 2001–Grasslands Bypass Project BO.
- November 21, 2000–Implementation of the CVPIA and Continued Operation and Maintenance of the CVP, Programmatic Consultation (1-1-98-F-0124). (Mother)
- December 14, 2001–Interim Renewal Contract Consultation 2002-2004, CVP, Supplemental Information.
- April 11, 2003–Informal Section 7 Consultation on Multiple Categories of Temporary Water Service Actions for CVP Water Service Contractors Occurring Under the Authority of Reclamation, for Water Years 2002-2005; Two-Year Concurrence for Water Years 2003-2004 (1-1-03-I-1689).
- September 5, 2003 A memorandum from the U.S. Bureau of Reclamation's (Reclamation) South Central California Area Office (SCCAO) requesting formal consultation
- October 9, 2003 A memorandum from the FWS requesting additional information
- February 27, 2004-Interim Renewal Contract Consultation, 2004-2006 (1-1-04-F-0360).
- July 30, 2004 - U.S. Fish and Wildlife Service (USFWS). 2004. Biological Opinion Formal and Early Section 7 Endangered Species Consultation on the Coordinated Operations of the Central Valley Project and State Water Project and the Operational Criteria and Plan. Sacramento, CA 1-1-04-F-0140. This consultation has been reinitiated.
- September 5, 2004 A memorandum from the U.S. Bureau of Reclamation's (Reclamation) South Central California Area Office (SCCAO) providing additional information

#### **Acronyms and Abbreviations Used**

ACOE	U.S. Army Corps of Engineers
Act (ESA)	Endangered Species Act
af	Acre-feet (1 acre-foot = 325,980 gallons)
afy	Acre-feet per year
BA	Biological Assessment
BNLL	Blunt-nosed leopard lizard
BO	Biological Opinion
CCC	Contra Costa Canal

CCRD	Columbia Resource Conservation District
CCWD	Contra Costa Water District
CDFG	California Department of Fish & Game
CDPR	California Department of Pesticide Regulation
CFR	Code of Federal Regulations
CH	Critical Habitat
CNDDDB	California Natural Diversity Database
CRLF	California red-legged frog
CTS	California tiger salamander
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DBH	Diameter at Breast (Basal) Height
DMC	Delta Mendota Canal
DWR	(California) Department of Water Resources
EPA	U.S. Environmental Protection Agency
ESRP	Endangered Species Recovery Program
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FKC	Friant-Kern Canal
FWS (Service)	U.S. Fish & Wildlife Service
FWUA	Friant Water Users Association
GEA	Grassland Ecological Area
GGs	Giant garter snake
GKR	Giant kangaroo rat
GWD	Grassland Water District
HC	Hollister Conduit
HGSB	Hartweg's golden sunburst
ITS	Incidental Take Statement
LTCR	Long Term Contract Renewal
LSM	Local Service Manual
MC	Madera Canal
MCWPA	Madera -Chowchilla Water and Power Authority
MWA	Mendota Wildlife Area
NPDES	National Pollutant Discharge Elimination System
OCAP	Operations Criteria and Plan
O&M	Operations and Maintenance
PC	Pacheco Conduit
PCA	Pest Control Advisor
PCE	Primary Constituent Element
Reclamation (USBR)	U.S. Bureau of Reclamation
RPM	Reasonable and Prudent Measure(s)
SBCWD	San Benito County Water District
SCADA	Supervisory Control and Data Acquisition
SCCAO	South-Central California Area Office (of Reclamation)
SCT	Santa Clara Tunnel
SCVWD	Santa Clara Valley Water District

SFWO	Sacramento Fish & Wildlife (Service) Office
SJD	San Justo Dam
SJKF	San Joaquin kit fox
SJWT	San Joaquin wooly-threads
SLDMWA	San Luis & Delta-Mendota Water Authority
SWP	State Water Project
T&C	Term(s) and Condition(s)
TFF	Tracy Fish Facility
TKR	Tipton kangaroo rat
USGS	U.S. Geological Survey
VELB	Valley elderberry longhorn beetle
VPFS	Vernal pool fairy shrimp
VPTS	Vernal pool tadpole shrimp
WWD	Westlands Water District

## **BIOLOGICAL and CONFERENCE OPINION**

### **Purpose of Consultation**

Due to the interrelated aspects of the Central Valley Project Improvement Act (CVPIA) and the Central Valley Project, Reclamation requested initiation of formal consultation for both the implementation of the CVPIA and continued operation and maintenance of the CVP on March 28, 1998 with the intent to ensure that all Endangered Species Act compliance requirements are addressed in a comprehensive manner. Therefore, the purpose of this consultation is to achieve Endangered Species Act compliance for the continued operation and maintenance of the CVP facilities operated and administered by Reclamation's South-Central California Area Office (SCCAO). It is assumed for this biological and conference opinion that all actions of the SCCAO O&M Plan described as being implemented in the Description of the Proposed Action will be implemented in their entirety.

### **Action Area**

The action area is defined in 50 CFR 402.14(g)(3) as the immediate area involved in the action and the entire area where effects to listed species extend as a result of the direct and indirect effects of the action. The action area for the proposed action includes Reclamation-owned CVP facilities, as well as the immediate vicinity around these facilities where operations and maintenance activities will occur, including equipment staging and work areas, for a distance of 100 yards.

### **Relationship of this Consultation to the CVPIA Programmatic Biological Opinion**

On November 21, 2000, Service issued a Programmatic Biological Opinion for the CVPIA (USFWS 2000) that characterized the effects of the CVPIA on federally listed species as a tiered approach that required consultation on the Operations and Maintenance of the CVP be completed

prior to site-specific consultation on long-term contract renewals before the contracts could be executed.

### **Description of the Proposed Action**

The SCCAO O&M Plan addresses routine maintenance and operations activities as they relate to Reclamation-owned SCCAO and CVP facilities, which are divided into the Delta Division, the Friant Division, the San Felipe Division, and the West San Joaquin Division. The actual O&M activities are conducted by the local agencies formed for that purpose. The SCCAO O&M Plan and the associated Field Operations Manual address potential impacts to sensitive species from minor construction and earth-moving activities, soil erosion control, weed and pest control activities, and other operations and maintenance activities conducted by Reclamation or entities contracted to operate and maintain Reclamation facilities.

### Plan Evaluation and Update

Reclamation will continually update the SCCAO O&M Plan every two to five years, as new information becomes available. An ongoing training program will be developed, and updated as needed, to ensure that all involved parties are kept informed of the changing contents and requirements of this plan. Reclamation and Service will meet every five years to review the effectiveness of avoidance and minimization measures, determine whether any adjustments need to be made to incidental take limits or any other aspects of this biological and conference opinion, and reinstate consultation as appropriate on newly listed species and designated critical habitat.

### SCCAO Service Area and Project Facilities

The SCCAO Office is located inside the Fresno city limits and has CVP Project facilities located in the following 16 counties within SCCAO jurisdiction: Contra Costa, Santa Clara, San Benito, San Joaquin, Stanislaus, Calaveras, Tuolumne, Mariposa, Merced, Madera, Fresno Kings, Tulare, and Kern Counties. The counties of Solano and Sacramento have fish release stations that are also within SCCAO jurisdiction, but are not within the SCCAO geographic boundary. The SCCAO O&M Plan and Field Operations Manual cover the following CVP divisions and facilities (see the maps in Attachment A):

Delta Division: The Delta Division consists of the Delta Cross Channel, Tracy Pumping Plant, Delta-Mendota Canal (DMC), Contra Costa Canal (CCC), and Contra Loma Dam. Additional features include the Tracy Fish Facility, Tracy Office Complex, nine salinity stations along Sacramento River, nine salinity stations along San Joaquin River, one salinity station on the Stanislaus River, and three salinity stations on the DMC.

- The Tracy Fish Facility (TFF) and Fish Release Sites – The TFF covers approximately 2 acres and is located at the southern end of the Delta just northwest of



the city of Tracy and the fish release sites are located near the towns of Antioch, Emmaton, and Rio Vista.

- Salinity Stations The Salinity stations are remote recording devices used to measure salinity and consist of a probe housed in pipe in the canal or river and a 25 to 100 square-foot concrete block building is associated with each station.
- Tracy Office Complex The complex consists of an administrative buildings, a water quality monitoring building, and the associated grounds that cover 10 acres.
- The Delta Cross Channel The Cross Channel is located approximately 22 miles south of Sacramento near Walnut Grove and consists of an excavated 1.2 mile long channel to divert water from Sacramento River to Snodgrass Slough to combat salinity intrusion into the Delta and to assure fresh water for the intakes to CCC and DMC.
- Tracy Pumping Plant The plant consists of an inlet channel, six pumps powered by 22,500 horsepower motors capable of pumping 767 cubic feet per second and discharge pipes.
- Delta-Mendota Canal (DMC) The DMC originates at the Tracy Pump Plant and terminates 115.7 miles to the south in Mendota Pool about 30 miles west of Fresno. The DMC features cover approximately 10,650 acres in a generally linear path adjacent to the canal. A system of Closed Drains (a.k.a. DMC Sumps) was constructed parallel to the canal on the up-slope between miles 99 and 110; water from the Closed Drains is discharged into ten sumps and water is pumped out of the sumps and discharged into the DMC.
- DMC Wasteways The Westley Wasteway is 4.01 miles long and is 90% concrete lined; the Newman Wasteway is 8.21 miles long and is concrete lined along 1.48 miles of its length; the Volta Wasteway is 11.88 miles long and is primarily unlined and extends through the Volta Wildlife Management Area to Los Banos Creek; and the Firebaugh Wasteway is 1.18 miles long and is primarily unlined.
- Contra Costa Canal (CCC) The Contra Costa Canal originates at Rock Slough about four miles southeast of Oakley. Water is lifted from Rock Slough by four pumping plants to the 47.7 mile long canal that terminates in Martinez Reservoir. Two short canals (Clayton – 5.2 miles and Ygnatio – 5.8 miles) and the Los Medanos Wasteway (two miles) are integrated into the CCC system.
- Contra Loma Dam This dam is an off-stream storage facility for the CCC and includes two dikes to help contain 2,100 acre feet of water. The dam is an earthfill structure that is 107 feet high with a crest length of 1,050 feet.

Friant Division The Friant Division consists of Friant Dam, Friant-Kern Canal, Madera Canal, and the Columbia-Mowry Facilities.

- Friant Dam and Millerton Lake This dam is the primary water storage facility for the San Joaquin River and contains 520,528 acre feet of water. The dam is a concrete gravity structure that is 319 feet high with a crest length of 3,488 feet.
- Friant Kern Canal (FKC) The Friant-Kern Canal extends 152 miles from Millerton Lake to the Kern River four miles west of Bakersfield. Along the 113-mile reach between Friant Dam and the White River there are over 500 overshoots, underdrains, recorder houses, drainage inlets, irrigation crossings, and turnouts. Almost 85% of the canal is concrete lined, and those portions of the canal have a maximum top width of 128 feet and a bottom width of 24 feet. The earthen portions of the canal have a bottom width that varies from 65 to 40 feet. The canal and right of way covers approximately 5,500 acres.
- Lake Woollomes This facility is an equalizing reservoir on the Friant-Kern Canal located about 30 miles north of the Kern River. The facility is about 500 acres and consists of two interconnected reservoirs covering approximately 300 acres. An individual Recreation Management Plan (RMP) is being developed for this facility, and when significant maintenance is needed for this feature separate environmental reviews will be conducted.
- Madera Canal This canal extends 35.9 miles from Millerton Lake into the Chowchilla River in Madera County. The canal right-of-way covers approximately 1,300 acres. Approximately 79% of the canal is unlined, and the width of the canal right-of-way varies, but averages approximately 150 feet. At about canal mile 18, the canal enters the Madera Equalizing Reservoir, which covers approximately 600 acres.
- Madera Equalizing Reservoir The 600 acre reservoir is an expansion of the canal watercourse that serves to increase storage capacity and to dampen flood flows that enter the canal. The reservoir area includes between 200 and 300 acres that can be flooded deeply. Most of the area is in rolling grasslands adjacent to the channel, although there are several earthen dikes or berms that link the hills to contain the water.
- Columbia-Mowry Facilities The facilities, which are located northeast of Firebaugh consist of: the Columbia Pumping Plant; Columbia Diversion Channel; Columbia Delivery Canal; structures on Columbia Canal; Columbia Relift Pump Plants A, B, C North, and C South with pipelines located on the discharges of Plant A, C North and C South; and Mowry Pumping Plant and pipelines. The pipelines are underground.

San Felipe Division The San Felipe Division is located in the central coastal area and includes Santa Clara County, the northern portions of San Benito and Monterey Counties, and the

southern portion of Santa Cruz County. Water from the CVP is delivered through the DMC to O'Neill Forebay and pumped into San Luis Reservoir. Water is delivered to the service areas through the Pacheco Tunnel Reach and other project features that include 48.5 miles of closed conduits, two pumping plants, and one small reservoir.

- San Justo Dam and Reservoir The dam and dike are the primary features of this facility, which is located approximately 2.5 miles east of Hollister. This 10,308 acre-foot capacity reservoir is filled using the 17.1 mile-long Hollister Conduit, which originates at the Pacheco Conduit.
- Pacheco Tunnel The two reaches of the tunnel (totaling 7.1 miles in length) are 9.5 feet in diameter carry water from pumping plants at the San Luis Reservoir
- Pacheco Conduit The conduit is a 7.92 mile-long; ten foot diameter subterranean concrete pipe that extends to a bifurcation structure that splits into the Hollister and Santa Clara conduits.
- Hollister Conduit The conduit is a 17.09 mile-long subterranean concrete pipe that extends from the Pacheco Conduit to San Justo Dam and Reservoir.
- Santa Clara Tunnel and Conduit The conduit is a 22.1 mile-long subterranean concrete pipe that extends from the Pacheco Conduit to the Coyote Pumping Plant.

West San Joaquin Division (San Luis Unit) The San Luis Unit is a mix of Federal and State features. The joint-use features include O'Neill Dam and Forebay, San Luis Dam, San Luis Reservoir, William R. Gianelli Pumping-Generating Plant, Dos Amigos Pumping Plant, Los Banos and Little Panoche Reservoirs, and San Luis Canal from O'Neill Forebay and Kettleman City (together with necessary switchyard facilities). The Federal-only features include O'Neill Pumping Plant and Intake Canal, Coalinga Canal, Pleasant Valley Pumping Plant, and San Luis Drain.

- San Luis Dam and Reservoir This jointly maintained dam and reservoir is located on San Luis Creek near Los Banos. The dam has approximately 1,033 acres of surface that is maintained by staff at the facility.
- William R. Gianelli Pumping-Generating Plant This jointly maintained facility is located on 20 acres at the base of San Luis Dam. Maintenance activities are typically conducted on the exterior of the facility.
- O'Neill Dam and Forebay This jointly maintained facility is located on San Luis Creek 2.5 miles downstream from San Luis Dam. The features at this location include the earthen dam, the O'Neill Pumping-Generating Plant, and the O'Neill Forebay Inlet Channel that extends 2,200 feet to the DMC (see below).

- O'Neill Pumping Plant-Generating Plant & Wildlife Area This facility consists of the inlet channel and 6 pumping-generating units to deliver water from DMC to O'Neill Forebay. The canal and pumping facilities sit on 35 acres which is maintained by Reclamation and an additional 700 acres surrounding the location are minimally managed by California Department of Fish and Game (CDFG).
- San Luis Canal This canal originates at O'Neill Forebay and extends 102.5 miles southeast to Kettleman City. The right-of-way for the concrete lined canal covers approximately 11,376 acres. There are numerous overshoots, underdrains, recorder houses, drainage inlets, irrigation crossings, and turnouts along the length of the canal.
- Dos Amigos Pumping Plant This jointly operated facility sits on 20 acres on the San Luis Canal, 17 miles south of the Forebay.
- Los Banos and Little Panoche Dams and Reservoirs These facilities are southwest of the town of Los Banos, on Los Banos and Little Panoche Creeks.
- San Luis Drain and Kesterson Reservoir These features were designed to convey and dispose of sub-surface irrigation from farmland in the San Luis service area. These features were never completed and have been abandoned due to environmental health and fiscal reasons. Minimal O&M activities are conducted to assure public health and safety.
- Pleasant Valley Pumping Plant This plant sits on about 45 acres and delivers water to the Coalinga Canal.
- Coalinga Canal This canal consists of a 1.6 mile long intake channel leading from the San Luis Canal to the Pleasant Valley Pumping Plant and an 11.6 mile long canal that delivers water to Coalinga. The right-of-way for this feature covers approximately 420 acres.

#### General O&M Activities Covered by this Plan

Maintenance of CVP facilities is needed to protect the integrity of the canals and distribution systems so that structures may operate efficiently and safely. Some required routine maintenance activities that may occur include: cleaning of underdrains, replacement of utilities, backfilling of gullies and holes caused by erosion, use of herbicides on canal maintenance roads or embankments to prevent excessive growth of weeds, and the use of rodenticides to prevent damage from burrowing animals. All activities covered by this O&M Plan are strictly routine; they involve a relatively small area, little earth is moved or disturbed, and the projects are of short duration.

The following is a summary of the routine O&M activities that may occur within the SCCAO jurisdiction and performed either by Reclamation personnel or on behalf of Reclamation by non-Federal entities. Table 2 in Attachment B includes a detailed description of the routine O&M activities listed below, as well as the effects analysis process used to determine the effects of each action.

Table 1 - Identification number for Operation and Maintenance Activities

1. Aquatic Weed Contact Herbicide Application	32. Facilities Inspection.
2. Blading and Disking Of Right-Of-Way.	33. Graffiti Removal from Concrete Structures.
3. Blading of O&M Roads.	34. Guardrail Installation.
4. Canal Bank Revegetation.	35. Valve Rehabilitation.
5. Canal/Tunnel/Conduit Liner Repair.	36. Ladders/Safety Nets/Float Repair and Replacement.
6. Chain Dragging - Interior Of Canal.	37. Pull and Check Pumps.
7. Chain Dragging Outside Bank Vegetation.	38. Radial Gate Rehabilitation.
8. Contact Herbicide Applications.	39. Recorder House Maintenance (Door Repair, Painting, Cleaning, Etc).
9. Copper Sulfate Applications.	40. Removal of Trash from Canal.
10. Canal Dewatering.	41. Right-Of-Way Trash Removal.
11. Drain Ditch and Channel Maintenance	42. SCADA System Repair and Upgrade.
12. Grazing.	43. Sign Repair.
13. Hand Control of Vegetation.	44. Stilling Well Maintenance (Pumping/Backflush Etc.).
14. Insecticidal Sprays.	45. Sump Pump Maintenance (Electrical/Mechanical/Piping).
15. Mudjacking/Injecting Grout.	46. Turnout Repair (In-Channel Prism).
16. Pre-emergent Herbicide Applications.	47. Turnout Sandblasting and Painting (In-Channel Prism)
17. Prescribed Burning For Weed Control.	48. Utility Trenching (SCADA/Power/Miscellaneous.)
18. Right Of Way Dust Abatement.	49. Wash and Paint Turnouts and Check Structures.
19. Right-Of-Way Mowing.	50. Wash Bridges.
20. Rip Rap.	51. Beach Belting.
21. Roadway Chipseal.	52. Canal Liner Extension.
22. Squirrel Baiting.	53. Canal Desilting Operations.
23. Bargate / Fence Installations.	54. Major Road Construction/Rehabilitation.
24. Bridge Maintenance (Running Pad Replacement).	55. Equalizing Reservoir Desilting.
25. Cableway Maintenance (Painting/Cleaning/Repair).	56. Dead Pool Pumping / Basin Discharge
26. Canal System Operator Residence Repair.	57. Structure Construction (Blockhouses, Stilling Wells Etc.)
27. Cattle Guard Rehabilitation.	58. Utility And Facilities Repair.
28. Down Drain Installation	59. Pump-In System Set-Up During Flood Years.
29. Drainage Improvements (Ditches or Pipe).	
30. Electrical Repairs by Utility Companies (PG&E / SCE or Others).	
31. Embankment Maintenance (Fill washes and Gullies).	

## I. SCCAO Areas of Facilities/Responsibilities (Excluding South Coast)

### 1. CVP Friant Division

A. O&M by Reclamation

1. Friant Dam

- a. Concrete Gravity Dam w/Appurtenant Structures  
Activity: 1, 8, 32

- b. Millerton Lake State Recreation Area – RMP  
Activity: Activities for this area are being addressed in a separate environmental document.

2. San Joaquin River

- a. Five Stream Gauging Sites  
Activity: 32, 33, 39, 42, 44, 58

3. Radio System Repeater Sites

- a. Bear Mountain  
Activity: 8, 13, 16, 23, 32, 33, 42, 43, 48, 39, 42, 44, 58

- b. Joaquin Ridge (located on San Luis Unit Map because of proximity)  
Activity: 8, 13, 16, 23, 32, 33, 42, 43, 48, 39, 42, 44, 58

- c. Granite  
Activity: 8, 13, 16, 23, 32, 33, 42, 43, 48, 39, 42, 44, 58

B. Friant-Kern Canal – O&M by Friant Water Users Authority (FWUA)

1. Friant-Kern Canal (151.8-mile)

Activity: 1, 2, 3, 4, 5, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 57, 58, 59

2. Lake Woolleemes – RMP

Activity: Activities for this area are being addressed in a separate environmental document. Activities associated with the current project and which are not being addressed in the RMP include the following: 1, 2, 3, 8, 9, 16, 19, 20, 22, 31, 32, 35, 37, 38, 40, 42, 43, 46, 47, 49, 55.

C. Madera Canal – O&M by Madera-Chowchilla Water & Power Authority (MCPWA)

1. Madera Canal (35.9 miles)

Activity: 3, 5, 8, 9, 10, 11, 13, 14, 15, 16, 19, 20, 22, 23, 24, 26, 27, 29, 30, 31, 32, 33, 34, 36, 38, 39, 40, 41, 42, 43, 44, 46, 47, 49, 50, 52, 53, 54, 58

2. Madera Equalizing Reservoir

Activity: 3, 8, 9, 10, 11, 13, 16, 19, 20, 22, 23, 30, 31, 32, 33, 34, 38, 39, 40, 41, 42, 43, 46, 47, 49, 53, 55

D. Columbia-Mowry Facilities – O&M by Columbia Resource Conservation District

(CRCD) The points on the map are from a global positioning system unit and do not exactly match the map.

1. Mowry Pumping Plant & Delivery Pipeline (underground)  
Activity: 13, 22, 23, 30, 32, 33, 35, 41
2. Columbia Diversion Channel (~300 yards)  
Activity: 11, 31, 32, 40, 41, 53
3. Columbia Main Pumping Plant  
Activity: 13, 22, 23, 24, 30, 32, 33, 35, 39, 50
4. Columbia-Ridge Ditch Delivery Canal (~.75 mile)  
Activity: 2, 3, 5, 8, 10, 13, 15, 19, 32, 40, 41
5. Re-Lift Pumping Plants (3) & Pipe Laterals (underground)  
Activity: 13, 30, 32, 35

## 2. CVP West San Joaquin Division (San Luis Unit)

### A. O&M by Westlands Water District (WWD)

1. Pleasant Valley Pumping Plant and intake channel (1.6-mile)  
Activity: 1, 7, 8, 16, 22, 29, 30, 31, 32, 33, 35, 36, 37, 39, 42, 43, 45, 53
2. Coalinga Canal (11.6 mile)  
Activity: 1, 2, 3, 6, 7, 8, 16, 21, 22, 29, 31, 32, 34, 38, 39, 40, 41, 42, 43, 44, 45, 49, 52,

53

### B. O&M by BOR-Lands Resource Team (LRT)

1. Fishing Access Points  
Activity: 32, 41

## 3. CVP Delta Division

### A. O&M by BOR (LRT)

1. DMC Fishing Access Points  
Activity: 32, 41

## II. Tracy Office Areas of Responsibility

### 1. CVP Delta Division

#### A. Operated by Reclamation:

1. Tracy Fish Facility – Maintained by San Luis & Delta-Mendota Water Authority (SLDMWA)  
Activity: 8, 11, 14, 25, 30, 32, 36, 37, 40, 42, 45, 58



2. Tracy Fish Release Sites - Maintained by SLDMWA

a. Antioch

**Activity: 8, 32**

b. Emmaton

**Activity: 3, 8, 23, 32**

c. Rio Vista

**Activity: 3, 8, 23, 32**

3. Tracy Office Complex

a. Adm. Bldg.

**Activity: 14, 23, 32, 58**

b. Water Quality Bldg.

**Activity: 14, 32, 58**

c. Grounds

**Activity: 8, 16, 32**

4. Salinity Stations – Sacramento River

a. Cache Slough

**Activity: 32**

b. Collinsville

**Activity: 32**

c. Emmaton

**Activity: 32**

d. Green Landing

**Activity: 32**

e. Pittsburg

**Activity: 32**

f. Rio Vista

**Activity: 32**

g. Staten Island

**Activity: 32**

h. Port Chicago

**Activity: 32**

i. Martinez

**Activity: 32**

5. Salinity Stations – San Joaquin River

a. Antioch

**Activity: 32**

b. Contra Costa

**Activity: 32**

c. Farrar Park

**Activity: 32**

d. Holland Tract

**Activity: 32**

e. Jersey Point

**Activity: 32**

f. San Andreas Landing

**Activity: 32**

g. Union

**Activity: 32**

h. Vernalis

**Activity: 32**

i. Victoria Canal

**Activity: 32**

6. Salinity Stations – Stanislaus River

a. Ripon

**Activity: 32**

7. Salinity Stations – DMC

a. Head

**Activity: 32**

b. Check 13

**Activity: 32**

c. Check 20

**Activity: 32**

d. Check 21

**Activity: 32**

**B. DMC Facilities – O&M by SLDMWA**

1. Delta Cross Channel (1.2 mile)

**Activity: 2, 3, 19, 22, 31, 32**

2. Tracy Pumping Plant

**Activity: 14, 30, 32, 35, 37, 42, 48, 58**

3. Tracy Control Room

**Activity: 14, 30, 32**

4. Tracy O&M Facilities

**Activity: 14, 32**

5. Delta Mendota Canal

a. Delta Mendota Canal (115.7 miles)

Activity: 2, 3, 5, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 50, 51, 52, 53, 54, 58

b. 6 sumps

Activity: 11, 30, 32, 37, 42, 45,

6. DMC Wasteways

a. Westley Wasteway

Activity: 3, 5, 11, 13, 23, 30, 31, 32, 40, 41, 43

b. Newman Wasteway

Activity: 3, 5, 11, 13, 23, 30, 31, 32, 40, 41, 43

c. Volta Wasteway

Activity: 3, 5, 11, 13, 23, 24, 30, 31, 32, 40, 41, 43

d. Firebaugh Wasteway

Activity: 3, 5, 11, 13, 23, 30, 31, 32, 40, 41, 43

C. Miscellaneous

1. Volta Holding Reservoir & Wildlife Area - California Department of Fish & Game

Activity: 3, 8, 32

D. Contra Costa Canal Facilities – O&M by Contra Costa Water District (CCWD)

1. Contra Costa Canal (47.7 Miles)

Activity: 1, 2, 3, 5, 8, 10, 11, 13, 15, 16, 19, 20, 22, 23, 24, 27, 29, 31, 32, 33, 35, 36, 40, 41, 42, 43, 46, 49, 53

2. Contra Costa Canal Pumping Plants

Activity: 13, 14, 16, 22, 23, 31, 32, 33, 35, 36, 37, 39, 42, 44, 45,

3. Contra Loma Dam and Reservoir – RMP

Activities for this area are being addressed in a separate environmental document.

Activities associated with the current project and which are not being addressed in the RMP include the following: 2, 3, 13, 16, 19, 22, 23, 32, 33, 38, 39, 41, 42, 43

4. Martinez Dam and Reservoir

Activity: 1, 13, 16, 19, 22, 23, 32, 33, 39, 41, 42, 43,

5. Short-Cut Pipeline (underground)

Activity: 32, 42,

6. Ygnatio Pumping Plant and Canal (5.2 miles)  
Activity: 1, 3, 5, 8, 10, 11, 13, 14, 15, 16, 19, 20, 22, 23, 24, 27, 29, 32, 33, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 49, 53

7. Clayton Canal (4.8 miles)  
Activity: 1, 3, 5, 8, 10, 11, 13, 15, 16, 19, 20, 22, 23, 24, 27, 29, 32, 33, 35, 36, 40, 41, 42, 43, 46, 49, 53

**2. CVP West San Joaquin Division (San Luis Unit)**

**A. Joint Use Facilities – O&M by Department of Water Resources (DWR)**

**1. San Luis Dam and Reservoir – RMP**

**Activity: Activities for this area are being addressed in a separate environmental document.**

**2. William R. Gianelli Pumping/Generating Plant (San Luis Pumping/Generating Plant)**

**Activity: 14, 30, 32, 35, 36, 37**

**3. O'Neill Dam and Forebay – RMP**

**Activity: Activities for this area are being addressed in a separate environmental document.**

**4. San Luis Canal (102.5 miles)**

**Activity: 2, 3, 5, 8, 11, 15, 16, 21,**

**5. Dos Amigos Pumping/Generation Plant**

**Activity: 2, 3, 8, 14, 16, 21,**

**6. Los Banos Detention Dam and Reservoir – RMP**

**Activity: Activities for this area are being addressed in a separate environmental document.**

**7. Little Panoche Creek Dam and Reservoir – RMP**

**Activity: Activities for this area are being addressed in a separate environmental document.**

**B. O&M by SLDMWA**

**1. O'Neill Pumping/Generating Plant**

**Activity: 3, 8, 14, 16, 21, 32, 35, 36, 37,**

**2. San Luis Drain (~ 85 mile) including Red Fern Drain**

**Activity: 2, 3, 6, 8, 10, 11, 16, 22, 23, 32, 40, 43, 44, 45, 46, 49, 50,**

3. Kesterson Reservoir (CDFG has some involvement)  
Activity: 32

C. Miscellaneous

1. O'Neill Forebay Wildlife Area – CDFG  
Activity: 32, 41,
2. Kesterson Wildlife Area – CDFG  
Activity: 32, 41

3. CVP San Felipe Division

A. O&M by Santa Clara Valley Water District

1. Pacheco Conduit (7.9 mile underground)  
Activity: 5, 8, 14, 16, 32, 35, 41, 42, 45, 48
2. Pacheco Tunnel (7.1 mile underground)  
Activity: 5, 8, 14, 16, 32, 41, 42, 45, 48
3. Pacheco Bifurcation Structure  
Activity: 8, 14, 16, 23, 32, 35, 41, 42, 45, 48
4. Pacheco Pumping Plant  
Activity: 8, 14, 16, 23, 25, 32, 37, 41, 42, 45, 48
5. Santa Clara Tunnel (~ 1 mile underground)  
Activity: 5, 8, 14, 16, 32, 41, 42, 45, 48
6. Santa Clara Conduit (~ 21.1 mile underground)  
Activity: 5, 8, 14, 16, 31, 32, 35, 41, 42, 45, 48
7. Coyote Pumping Plant  
Activity: 8, 14, 16, 23, 25, 32, 37, 41, 42, 45, 48

B. O&M by San Benito County Water District

1. San Justo Dam and Reservoir – RMP  
Activity: **Activities for this area are being addressed in a separate environmental document. Activities associated with the current project and which are not being addressed in the RMP include the following: 8, 19, 22, 32**
2. Hollister Conduit (17.1 mile underground)  
Activity: 32

**Proposed Conservation Measures**

Table 2 lists all of the measures incorporated into the project activities to reduce, minimize, and eliminate take of Federally listed species. In addition to the measures described in Table 2, Reclamation has included the following measures into the Project Description, to reduce and minimize take of listed species.

#### San Joaquin Kit Fox

There are six general measures for conserving the San Joaquin kit fox from the effects of a minor project:

1. Determine the presence of kit fox dens (natural or in pipes and culverts).
  - a. Pre-construction surveys within the project area shall be conducted no more than 30 calendar days prior to the start of construction in accordance with the most current protocols approved by Service and CDFG.
  - b. Surveys for dens shall be conducted by qualified biologists with demonstrated experience in identifying San Joaquin kit fox dens.
  - c. Pipes and culverts shall be searched for kit foxes prior to being moved or sealed to ensure that an animal has not been trapped.
2. Protect all San Joaquin kit fox dens to the maximum extent practicable as determined by the on-site biologist.
3. Identify type of den (natal or non-natal) and its status (occupied or unoccupied) based on the extant Service guidance (Service 1999):
  - a. Known den: any existing natural den or human-made structure for which conclusive evidence or circumstantial evidence can show that the den is used or has been used at any time in the past by the San Joaquin kit fox.
  - b. Potential den: any natural den or burrow within the range of the species that has entrances of appropriate dimensions (4 to 12 inches in diameter) to accommodate San Joaquin kit foxes. SCCAO will survey and investigate using photo-detection equipment, track plate, or other methods to determine species utilization. If no information is collected that would indicate use by other species, the den will be treated as a potential kit fox den. Pupping den: any known San Joaquin kit fox den (as defined) used by kit foxes to whelp and/or rear their pups.
  - c. Atypical den: any known San Joaquin kit fox den that has been established in, or in association with, a human-made structure.
4. Identify and execute appropriate action(s) regarding notification, buffers, excavation and fill, or seal-off:

- a. Occupied natal den: if an occupied natal den is visible or encountered within the project limits, or other accessible land, or on publicly accessible land within 1000 feet of the project construction area, the project will be constructed between August 1 and November 30 and the Service shall be contacted immediately, before any project action occurs.
  - b. A buffer or exclusion zone shall be established to protect the physical den and surrounding habitat of unoccupied natal dens and all non-natal dens that can be avoided:
    - i. Unoccupied natal dens shall be surrounded with a 200 feet buffer and the Service will be contacted. Occupied and unoccupied non-natal dens shall be surrounded with a 100 feet buffer.
    - ii. When occupied dens have been found on or near the project site, ground disturbing activities shall be restricted during the period December 1 to July 31.
    - iii. During this period, project activities within 0.3 mi of occupied natal dens are prohibited. Buffer zones shall be delineated with a temporary fence or other suitable barrier that does not prevent dispersal of the fox. Alternately, the project construction area can be delineated with temporary fence, flagging, or other barrier.
  - c. Unless necessary for safety, the project site shall not be lighted between sunset and sunrise.
  - d. Pipes or culverts with a diameter greater than 4 inches shall be capped or taped closed when it is ascertained that no San Joaquin kit fox is present. Any kit fox found in a pipe or culvert shall be allowed to escape unimpeded.
5. If a natural den cannot be avoided and must be destroyed, the following guidelines shall be followed:
- a. Prior to the destruction of any den, the den shall be monitored for at least 3 consecutive days to determine its current status. Activity at the den shall be monitored by placing tracking medium at the entrance and by standard spotlighting detection techniques. If no kit fox activity is observed during this period, the den shall be destroyed immediately to preclude subsequent use. If kit fox activity is observed at the den during this period, the den shall be monitored for at least 5 consecutive days from the time of observation to allow any resident animal to move to another den during its normal activities. Use of the den can be discouraged during this period by partially plugging the entrance(s) with soil in such a manner that any resident animal can escape easily. Destruction of the den

may begin when, in the judgment of a Service or Service-approved biologist, the animal has moved to a different den. The biologist shall be trained and familiar with kit fox biology. If the animal is still present after five or more consecutive days of plugging and monitoring, the den may be excavated when, in the judgment of the Service-approved biologist, it is temporarily vacant, for example during the animal's normal foraging activities.

- b. All dens shall be excavated by hand, by or under the supervision of, a Service-approved biologist.
  - c. The den shall be fully excavated and then filled with dirt and compacted to ensure that kit foxes cannot reenter or use the den during the construction period. If, at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den shall be resumed. Destruction of the den may be resumed, when in the judgment of the Service-approved biologist, the animal has escaped from the partially destroyed den.
  - d. Non-natal dens may be excavated at any time of the year natal dens shall be excavated only between August 15 and November 1.
6. Within ten (10) working days of the completion of earthmoving, SCCAO will replace all excavated kit fox dens with artificial dens on a 2:1 basis. The location and design of the artificial dens will be approved by Service prior to installation.

#### Giant Kangaroo Rat and Tipton Kangaroo Rat

There are seven general measures for conserving giant and Tipton kangaroo rats from the effects of a routine O&M project:

1. Determine the presence of kangaroo rat burrows and sign.
  - a. Pre-construction surveys to determine presence or sign of federally listed kangaroo rats within the project area shall be conducted no more than 30 calendar days prior to the start of construction. If listed kangaroo rats are located within the construction action area, Service will be contacted to discuss ways to proceed with the project and avoid take to the maximum extent practicable.
  - b. Surveys for burrows and other sign shall be conducted by qualified biologists with demonstrated experience in identifying kangaroo rat burrows.
  - c. Pipes and culverts shall be searched for kangaroo rats prior to being moved or sealed to ensure that an animal has not been trapped.
2. A 50-foot buffer or exclusion zone shall be established around active burrows and precincts. Project-related activities within the buffer zone shall be prohibited.



3. When occupation of the project site by the giant kangaroo rat has been determined, ground disturbing activities shall be restricted during the period February 1 through May 31.
4. Unless necessary for safety, the project site shall not be lighted during night time hours.
5. If active burrows cannot be avoided, SCCAO shall obtain authorization to destroy burrows from Service prior to disturbance.
6. When listed kangaroo rats are likely to be present within the construction limits, tightly woven materials are to be used at the site in order to prevent kangaroo rats from being entangled and injured inadvertently by project activities. Acceptable substitutes include coconut coir matting or tackified hydroseeding. This limitation will be communicated to the contractor through the use of special provisions included in the bid solicitation package.
7. Retired agricultural lands that will be temporarily disturbed by project implementation shall be restored to pre-construction conditions.

#### Blunt-Nosed Leopard Lizard

The blunt-nosed leopard lizard is a fully protected species under the California Fish and Game Code § 5050. There are six general measures for conserving blunt-nosed leopard lizards from the effects of a routine O&M project:

1. Determine the presence of blunt-nosed leopard lizard burrows and sign.
  - a. When the species is likely to be present, perform a protocol survey no longer than one year prior to construction. Pre-construction surveys within the project area shall be conducted to determine presence or sign of blunt-nosed leopard lizard no more than 30 calendar days prior to the start of construction. If blunt-nosed leopard lizards are located within the construction limits, Service will be contacted to discuss ways to proceed with the project and avoid take to the maximum extent. Restriction on projects in any area where blunt nose leopard lizards are present, during the months of July and August.
  - b. Surveys for burrows and other sign shall be conducted by an SCCAO biologist or Service approved biologist with demonstrated experience in identifying blunt-nosed leopard lizard burrows.
  - c. Pipes and culverts shall be searched for leopard lizards prior to being moved or sealed to ensure that an animal has not been trapped.

2. A 50-foot buffer or exclusion zone shall be established around active burrows and egg clutch sites. Project-related activities within the buffer zone shall be prohibited.
3. Burrows that may be used by blunt-nosed leopard lizards shall be avoided. Initial surface disturbing actions that occur during the active blunt-nosed leopard lizard season shall be monitored by a Service-permitted biological monitor. Provided there is suitable habitat adjacent to the project site and it is available in adequate abundance, blunt-nosed leopard lizards shall be allowed to vacate affected sites prior to ground disturbance. Should one or more blunt-nosed leopard lizards be discovered within the project site after ground disturbance, project activities shall cease until the lizard(s) vacate the area of their own accord. If the lizard(s) fails to vacate the area, a Service-permitted biologist may attempt to herd the blunt-nosed leopard lizards to the adjacent suitable habitat outside project boundaries. No capture, removal or holding of the blunt-nosed leopard lizards is allowed under state law, and cannot be approved by Service.
4. Project activities that may result in destruction of dens or burrows likely to harbor blunt-nosed leopard lizards shall occur during the active season of this listed reptile, i.e., between April 15 and October 15 and air temperature between 75 and 95 degrees Fahrenheit (°F). This does not preclude work done on pavement or in areas where the blunt leopard is not present. This will maximize the lizard's ability to escape from slow moving vehicles and minimize the risk of entombment in burrows. In addition, ground disturbing activities that occur in areas inhabited by the blunt-nosed leopard lizard shall occur only during daylight hours.
5. If trenches or pits will be left open between construction tasks for periods of more than seven hours, the following measures shall be taken to minimize the risk of blunt-nosed leopard lizards falling into the trench or pit. Wooden ramps or other structures of suitable surface that provide adequate footing for the blunt-nosed leopard lizard shall be placed in the trench or pit to allow for unaided escape. The trench or pit shall be surveyed in the morning and late afternoon hours to ascertain whether blunt-nosed leopard lizards have fallen into the trench. If using the escape ramps and coaxing by a Service-permitted biologist fail to result in the blunt-nosed leopard lizard vacating the trench or pit, Service shall be contacted for advice.
6. If areas adjacent to project sites lack adequate habitat to provide for the thermoregulatory or cover requirements for the blunt-nosed leopard lizard, SCCAO shall contact Service. Service shall advise SCCAO if it is appropriate to place temporary cover in the form of appropriately placed boards for the animals. The boards must be of sufficient length and width, and placed in such a manner that the lizards are able to take temporary shelter underneath. The boards shall be placed outside the project area, with the nearest shelter placed within 10 feet of the project and exclusion zone boundary or as judged appropriate by the Service.

San Joaquin Kit Fox, Blunt-nosed Leopard Lizard, Giant Kangaroo Rat, and Tipton Kangaroo Rat - Avoidance and Minimization Measures that will be Implemented Prior to and During Ground Disturbance

On those occasions when borrow material will be used for a project, SCCAO shall follow the procedures outlined below to ensure that borrow materials come from sites that are in compliance with the Act. Also presented below is standard language for SCCAO to use in contracts to protect listed species that SCCAO will include in all construction and maintenance subcontracts. SCCAO and all its contractors will implement these requirements.

1. The SCCAO biologist shall have oversight over implementation of all the measures described in this section, and shall have the authority to stop project activities, through communication with the SCCAO's Project Engineer, if any of the requirements associated with these measures are not being fulfilled. If biologist/construction liaison has requested a stop work do to take of any of the listed species Service and CDFG will be notified within one day via email or telephone. SCCAO shall include the following conservation measures in all construction and maintenance projects and contracts:
2. Project employees shall be directed to exercise caution when commuting within listed species habitats. A 20-mile per hour speed limit will be strongly encouraged on unpaved roads within listed species habitats.
3. Cross-country travel by vehicles will be prohibited, unless authorized by Service.
4. Project employees shall be provided with written guidance governing vehicle use, speed limits on unpaved roads, fire prevention, and other hazards.
5. Prior to initiation of ground breaking, the SCCAO or Service-approved biologist will conduct an education and training session for all construction personnel. All individuals who will be involved in the site preparation or construction shall be present, including the project representative(s) responsible for reporting take to Service and the California Department of Fish and Game (CDFG). Training sessions shall be repeated for all new employees before they access the project site. Sign up sheets identifying attendees and the contractor/company they represent shall be provided to Service with the post-construction compliance report. At a minimum, the training shall include a description of the natural history of the species affected by the minor transportation project undertaken and include information on the San Joaquin kit fox, the giant and Tipton kangaroo rats, or the blunt-nosed leopard lizard, and their habitats, as appropriate. The training shall include the general measures that are being implemented to conserve these species as they relate to the project, the penalties for non-compliance, and the boundaries (work area) of the project. To ensure that employees and contractors understand their roles and responsibilities, training shall be conducted in languages other than English, as appropriate.

6. A litter control program shall be instituted at each project site. All workers ensure their food scraps, paper wrappers, food containers, cans, bottles, and other trash from the project area are deposited in covered or closed trash containers. The trash containers shall be removed from the project area at the end of each working day.
7. No firearms (except for Federal, State, or local law enforcement officers and security personnel) or canine or feline pets shall be permitted on construction sites to avoid harassment or killing or injuring of listed species.
8. Maintenance and construction excavations greater than 2 feet deep either shall be covered, filled in at the end of each working day, or have earthen escape ramps no greater than 200 feet apart provided to prevent entrapment of listed species.
9. All construction activity shall be confined within the project site, which may include temporary access roads, haul roads, and staging areas specifically designated and marked for these purposes, as described in Avoidance Measure 13 below. At no time shall equipment or personnel be allowed to adversely affect areas outside the project site without authorization from Service.
10. The Project Engineer or his/her designee shall be responsible for implementing these conservation measures and shall be the point of contact for each project.
11. All grindings and asphaltic-concrete waste shall be stored within previously disturbed areas absent of habitat and at a minimum of 150 feet from any culvert, wash, pond, vernal pool, or stream crossing.
12. Restoration and re-vegetation work associated with temporary impacts shall be done using California endemic plant material from on-site or local sources (i.e., local ecotype). Plant materials from non-local sources shall be allowed only with written authorization from Service. To the maximum extent practical (i.e., presence of natural lands), topsoil shall be removed, cached, and returned to the site according to successful restoration protocols. Loss of soil from run-off or erosion shall be prevented with straw bales, straw wattles, or similar means provided they do not entangle, block escape or dispersal routes of listed animal species.
13. The project construction area shall be delineated with high visibility temporary fencing at least five (5) feet in height, flagging, or other barrier to prevent encroachment of construction personnel and equipment onto any sensitive areas during project work activities. Such fencing shall be inspected and maintained daily until completion of the project. The fencing will be removed only when all construction equipment is removed from the site. Actions within the project area shall be limited to vehicle and equipment operation on existing roads. No project activities will occur outside the delineated project construction area.

14. Prior to any ground disturbance, pre-construction surveys shall be conducted for San Joaquin kit fox, giant kangaroo rat, Tipton kangaroo rat and blunt nosed leopard lizard. These surveys will consist of walking surveys of the project limits and adjacent areas accessible to the public to determine presence of the species (i.e., kit fox dens and related sign).
15. Only Service-approved personnel holding valid permits issued pursuant to section 10(a)(1)(A) of the Act will be allowed to trap or capture listed species. Any relocation plan will be approved by Service prior to release of any listed species.
16. Because dusk and dawn are often the times when listed species are most actively foraging, all construction activities will cease one half hour before sunset and will not begin prior to one half hour before sunrise. Except when necessary for driver or pedestrian safety, lighting of a project site by artificial lighting during night time hours is prohibited.
17. Tightly woven fiber netting or similar material shall be used for erosion control or other purposes at the project site to ensure that endangered species do not get trapped. This limitation will be communicated to the contractor through use of Special Provisions included in the bid solicitation package.
18. Use of rodenticides and herbicides at the project site shall be utilized in such a manner to prevent primary or secondary poisoning of listed species, and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Pesticide Regulation, and other appropriate State and Federal regulations, as well as additional project-related restrictions deemed necessary by Service or CDFG.

#### Valley Elderberry Longhorn Beetle

The proposed conservation and minimization measures were developed to be consistent with those found in the Service's July 9, 1999, *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Conservation Guidelines).

1. Proposed project sites within the range of the valley elderberry longhorn beetle should be surveyed for the presence of the beetle and its elderberry host plant by a qualified biologist.
  - a. Prior to any earth-moving activities in areas where pre-activity surveys have been done, coordination with biologists may be needed so that sensitive areas can be identified. A pre-activity survey will be conducted for listed species by a qualified biologist within two weeks of the proposed start of the activity.
2. Core avoidance area includes all area within 20 feet of the dripline of any elderberry plant with a stem measuring 1.0 inch or greater in diameter at ground level. Core avoidance

areas should not be disturbed during or after construction or during operation of the project. Buffer avoidance area includes all area within 100 feet of any elderberry plant with a stem measuring 1.0 inch or greater in diameter at ground level. Firebreaks may not be included in the buffer zone. In buffer areas construction-related disturbance should be minimized, and any damaged area should be promptly restored following construction.

- a. Fence and flag all areas to be avoided. Provide a minimum setback of at least 20 feet from the dripline of each elderberry plant. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction
3. Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.
4. Both core and buffer avoidance areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding, and trash removal are usually appropriate.
5. All earth moving activities, and erosion control activities, regardless of location, will be reviewed by a qualified biologist. This must be done to ensure that all avoidance and mitigation measures are being met, and to determine if timing of operations or other factors can be scheduled to avoid disturbance to a species at a critical time. During earth disturbing activities, the presence of a qualified biologist may be necessary on-site until all earth moving activities are complete, especially in areas of known presence of elderberry shrubs.
6. All efforts will be made to reduce blowing dust in areas inhabited, or suited for inhabitation, by the beetle. Activities generating high amounts of dust will be conducted during periods of low winds. If such activities must be conducted during high winds, the generation of dust will be minimized by spraying water on the site with water trucks.
7. Application of pesticides will be conducted in compliance with all state and federal regulations. As required by the State of California, a licensed Pest Control Advisor (PCA) will write a recommendation prior to application of any pesticide to Reclamation lands. The PCA will be certified in the appropriate category. Restricted pesticides must be applied by a certified applicator (following a recommendation written by a licensed PCA), but non-restricted pesticides may be applied by a non-certified applicator without the certified applicator being present. The non-certified applicator must be properly trained and must use the certification number of a certified applicator. No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant

should be used in the core and buffer avoidance areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.

8. Mechanical control methods such as mowing will be used as an alternative to the applications of herbicides, whenever appropriate. Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five (5) feet of elderberry shrub stems. Mowing must be done in a manner that avoids damaging shrubs (e.g., stripping away bark through careless use of mowing/trimming equipment).
9. The Conservation Guidelines will be followed when elderberry shrubs are encountered during O&M activities. Where practicable, areas where elderberry shrubs occur shall be designated as avoidance areas that will be protected from disturbance.
10. If an elderberry shrub is growing in a high maintenance area, the determination as to whether the elderberry shrub will be able to be transplanted will be made by a qualified biologist. Transplanted elderberry shrubs will be moved according to protocols in the Conservation Guidelines.
11. In the event that take cannot be avoided, contact Service for information prior to starting the action

#### San Joaquin Woolly-threads and California Jewelflower

Prior to construction, up to a year in advance, plant surveys shall be conducted at the appropriate times and methods according to the following or most current guidelines: *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (Service 1996); and *General Rare Plant Survey Guidelines and Supplemental Survey Methods for California jewelflower and San Joaquin woolly-threads* (Service undated [appx. 2000]).

1. Extant populations of either of these two listed plants shall be avoided to the greatest extent practicable. The locations of listed plants shall be avoided and temporarily fenced or prominently flagged to prevent inadvertent encroachment by vehicles and equipment during project-related activities. Information regarding the location of listed plant populations shall be provided to CDFG's California Natural Diversity Database (CNDDDB) according to their reporting protocols. A completed copy of the reporting form and a topographic quad map with the population location precisely marked shall be submitted to Service. If extant populations cannot be avoided, surface disturbance shall be scheduled after seed set and prior to germination. Collection of seed, with reseeded undertaken at the project site following completion of the project, during seasonal time frames and weather conditions favorable for germination and growth may also be required. Topsoil may be stockpiled and replaced after project completion pursuant to the most current and successful methodology.

2. An assessment of plant occurrences shall be conducted, by an SCCAO biologist or Service-approved biologist, during the appropriate season prior to scheduled construction. Effects to extant occurrences may be considered minimized when: (a) the number of plants lost is less than 1 percent of the affected population including any actual or potential seed bank, and disturbance is temporary; (b) the amount of habitat lost is less than 1 percent of the occupied habitat for the affected occurrence; and (c) the surface and subsurface hydrology of the site remains unaltered in terms of effects to on-site listed plant populations.
3. Herbicides shall not be permitted within 500 feet of listed plant populations identified during pre-project surveys. Pesticide and insecticides shall not be permitted during the insect pollination period.

#### Bakersfield Cactus

1. Since this cactus is observable throughout the year, plant surveys shall be conducted 30 days prior to construction.
2. Bakersfield cactus populations and individuals of this species shall be surrounded by a 100 feet buffer or exclusion zone at all times.
3. Herbicides shall not be permitted within 500 feet of listed plant populations identified during pre-project surveys. Pesticide and insecticides shall not be permitted during the insect pollination period.

#### Aleutian Canada Goose

1. Do not convert agricultural lands to other uses in the high-use areas identified above for Aleutian Canada geese. Any proposed conversion of agricultural land requires formal consultation.
2. To the extent practicable, restrict construction activities in areas used for Aleutian Canada goose wintering habitat to the period between May 15 and September 30.
3. To the extent practicable, avoid disturbing flocks of foraging geese during peak goose foraging times: the first and last two hours of daylight.
4. In the event that take cannot be avoided, contact Service for information prior to starting the action.

#### Bald Eagle

1. If construction activities are going to occur near areas with suitable nesting sites (snags or large trees over 20" diameter) survey for eagle activity prior to construction.



2. Construction activities must not occur within 0.5 miles of a nest site from January 1 through August 31.
3. Construction activities must not occur within 0.5 miles of a roost site from November 15 through March 15.
4. Avoid removing large, mature trees or snags over 20" diameter at breast height (DBH) along watercourses, lakes or reservoirs.
5. Maintain and protect local fish populations from sedimentation and other habitat disturbance.
6. If nest surveys are conducted, begin after mid-April.
7. In the event that take cannot be avoided, contact Service for information prior to starting the action.

#### California Red-legged Frog

1. A Service approved biologist shall survey the work site two weeks before the onset of activities.
2. If California red-legged frogs cannot be relocated within ¼ mile of the work site within the same drainage, then the Service-approved biologist shall contact the appropriate Service office before work activities begin.
3. Before any construction activities begin on any project, a Service approved biologist shall conduct a training session for all construction personnel about the California red-legged frog, its habitat, and the necessary measures to protect or avoid it on-site.
4. During project activities, all trash that may attract predators shall be properly contained, removed from the work site and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.
5. All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 20 meters from any riparian habitat or water body. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
6. The spread or introduction of invasive exotic plant species shall be avoided to the maximum extent possible. Project sites shall be revegetated with an appropriate assemblage of grasses, riparian, or wetland vegetation suitable for the area. A species list and restoration plan shall be included with the project proposal for review by the Service.

7. To the maximum extent possible, stream contours shall be returned to their original condition at the end of project activities.
8. The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated.
9. Work activities should be completed between April 1 and November 1 in areas where frogs may be affected. Should the proponent or applicant demonstrate a need to conduct activities outside this period, they must contact the Service before beginning the project.
10. Only Service approved biologists shall participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.
11. Best management practices to control erosion during and after project implementation shall be implemented.
12. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters (mm) to prevent California red-legged frogs from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that will allow flow to resume with the least disturbance to the substrate.
13. Any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes that are captured on site shall be permanently removed from the wild.
14. Additional or modified measures to reduce the adverse effects of actions may be identified during the project review by Reclamation and Service.
15. In the event that take cannot be avoided, contact Service for information prior to starting the action.

#### Giant Garter Snake

1. Avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat. Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.
2. Construction activity within habitat should be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move and avoid danger. Between October 2 and April 30 contact the Service's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.

3. Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.
4. Construction personnel should receive Service-approved worker environmental awareness training. This training instructs workers to recognize giant garter snake and its habitat(s).
5. The project area should be surveyed for giant garter snakes 24-hours prior to construction activities. Survey of the project area should be repeated if a lapse in construction activity of two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Report any sightings and any incidental take to Service immediately by telephone at (916) 979-2725.
6. Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
7. After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions. Restoration work may include replanting species removed from banks or with emergent vegetation in the active channel.
8. In the event that take cannot be avoided, contact Service for information prior to starting the action.

### **Status of the Species and Environmental Baseline**

#### Vernal Pools and Critical Habitat for Vernal Pool Species

Several of the features are situated in or pass through designated critical habitat for one or more listed vernal pool species:

*Vernal pool fairy shrimp* - Unit 24B (Friant-Kern Canal)

*Hoover's spurge* - Unit 7A (Friant-Kern Canal)

*Succulent owl's clover* - Unit 5 (Friant-Kern Canal)

*San Joaquin Valley Orcutt grass* - Unit 4 (Friant-Kern Canal), Unit 6B (Friant-Kern Canal)

There are no vernal pools within the action area of this consultation. Vernal pool fairy shrimp and vernal pool tadpole shrimp are the only two vernal pool species likely to occur in the action area. Where they occur, they would be located within isolated ephemeral features such as shallow ditches or depressions, most likely on historic vernal pool soils. We do not consider the seasonal wetland features associated with these facilities to be a primary constituent of critical habitat for any of the vernal pool species because of their ecological and hydrologic isolation. In addition, such features would not have suitable hydrology to support any of the listed vernal pool

plants.

### Blunt-nosed Leopard Lizard

The blunt-nosed leopard lizard (*Gambelia* (= *Crotaphytus*) *sila*) was listed as Endangered by the USFWS in 1967 (32 FR 4001). Recovery of the blunt-nosed leopard lizard is discussed in the Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1998).

#### *Life History and Habitat Requirements*

The blunt-nosed leopard lizard was originally described and named from a specimen collected from Fresno County in 1890. This lizard is a relatively large lizard of the family Iguanidae (Stebbins 1985). Adult males are typically 3.4 to 4.7 inches from snout to vent and weigh between 31.8 and 37.4 grams. The adult females are similar in length (range 3.4 to 4.4 inches), but weigh only 20.6 to 29.3 grams (Tollestrup 1982, Uptain et al. 1985 in USFWS 1998).

The blunt-nosed leopard lizard inhabits Nonnative Grassland, Valley Sink Scrub, Valley Needlegrass Grassland, and Alkali Playa communities on the floor of the San Joaquin Valley (Holland 1986). It also is found in low foothills, canyon floors, plains, washes, arroyos, and open areas with scattered low bushes on alkali flats, particularly those Saltbush Scrub communities within the foothills of the southern San Joaquin Valley and the adjacent Carrizo Plain. The above habitat classifications by Holland (1986) are subsumed within the more general Alkali Desert Scrub and Annual Grassland habitat types described by Mayer and Laudenslayer (1988).

Blunt-nose leopard lizards are typically absent where habitat conditions include steep slopes, dense vegetation, or areas subject to seasonal flooding (Montanucci 1965). Preferred substrates range from sandy or gravelly soils to hardpan. It prefers flat terrain and tends to avoid dense or tall herbaceous cover that restricts vision for foraging and escape from predators (Warrick et al. 1998).

These lizards frequently seek refuge in small mammal burrows (Stebbins 2003); using small rodent burrows for shelter from predators and temperature extremes. Burrows are usually abandoned ground squirrel tunnels or kangaroo rat burrows (abandoned or occupied). In areas of low mammal burrow density, lizards will construct shallow, simple tunnels in earth berms or under rocks. Burrows are important structures that enable blunt-nosed lizards to moderate temperature extremes and avoid a wide-range of predators. Taxa preying upon blunt-nosed lizards include: snakes, shrikes, hawks, owls, eagles, squirrels, skunks, badgers, coyotes, and foxes (Montanucci 1965, Tollestrup 1979).

The diet of the blunt-nosed lizard consists primarily of insects and other lizards (USFWS 1998). Insects consumed include grasshoppers and crickets in the Order Orthoptera and moths of the Lepidoptera. Other lizards consumed by blunt-nosed lizards include: side-blotched lizards (*Uta stansburiana*), coast horned lizards (*Phrynosoma coronatum*), California whiptails (*Cnemidophorus tigris*), and the spiny lizards (*Sceloporus* spp.) (USFWS 1998). Interspecific competition is hypothesized to occur between blunt-nosed lizards and California whiptails because they consume similar food items (Montanucci 1965, USFWS 1998).

Above ground activity of blunt-nosed lizards is primarily dependent on temperature with optimal activity occurring when air temperatures are between 74 and 104 degrees Fahrenheit (°F) and ground temperatures are between 72 and 97 degrees F (USFWS 1985a). Smaller lizards and young have a wider activity range than adults and as a result they emerge from hibernation earlier than adults, remain active later in the year, and begin their activity earlier during the day (Montanucci 1965). These temperature-related patterns result in adult lizards being active above ground from March or April through June or July. By the end of June or July, the majority of sightings are of sub-adult and hatchling lizards (USFWS 1998).

Breeding begins within a month of emergence from dormancy and typically lasts from the end of April through the beginning of June, but occasionally may last through the end of June. Adults are paired and frequently occupy the same burrow during the breeding period and for up to several months afterwards (Montanucci 1965, USFWS 1998). Two to six eggs are laid in June or July in a chamber excavated for a nest or in an existing burrow system. Adverse conditions can delay or halt reproduction, while variable environmental conditions may result in more than one clutch of eggs being produced per year (USFWS 1998).

#### *Historical and Current Distribution*

This species is endemic to the San Joaquin Valley (Montanucci 1970, Tollestrup 1979 in USFWS 1998) and is thought to have once occurred from the Tehachapi Mountains in Kern County northward to Stanislaus County (USFWS 1998). Although the boundaries of its original distribution are uncertain, blunt-nosed leopard lizards probably occurred in the San Joaquin Valley from Stanislaus County in the north to the Tehachapi Mountains of Kern County in the south, and from the Coast Range Mountains, Carrizo Plain, and Cuyama Valley in the west to the foothills of the Sierra Nevada in the east. In general, blunt-nosed leopard lizards are not found in areas with steep slopes, dense vegetation or in areas subject to seasonal flooding.

The current range is thought to include scattered populations throughout the undeveloped land of the San Joaquin Valley and in the foothills of the Coast Range below 2,600 feet (Montanucci 1970, USFWS 1998, CDFG 2002). Lizards occur on scattered parcels of undeveloped land on the valley floor, most commonly annual grassland and valley sink scrub. The lizards also inhabit alkali playa and valley saltbush scrub. This species occurs in the San Joaquin Valley from Stanislaus County through Kern County, and along the eastern edges of San Luis Obispo and San Benito Counties. In the southern San Joaquin Valley, extant populations are known to occur in the Kern and Pixley National Wildlife Refuges, Liberty Farms, Allensworth, Antelope, the Carrizo and Elkhorn Plains, Buttonwillow, Elk Hills and Tupman Essential Habitat Areas, north of Bakersfield around Poso Creek, and western Kern County around the towns of Maricopa, McKittrick, and Taft.

#### *Reasons for Decline and Threats to Survival*

Populations of the blunt-nosed leopard lizard declined to levels warranting listing because of the conversion and degradation of suitable habitat (USFWS 1998). Agricultural, urban, petroleum, mineral, and other development activities altered an estimated 94 percent of the wildlands on the Valley floor by 1985 (USFWS 1985b). The conversion of land for agricultural purposes along the Friant Kern Canal has led to a loss of patches of suitable habitat large enough likely to be

inhabited by blunt-nosed leopard lizard. Ground disturbance, including that associated with agricultural practices, may kill or harm individuals. Due to its obligate use of burrows, the blunt-nosed leopard lizard can be adversely impacted by rodent control programs (through loss of burrows over time). Also, there is some concern that the application of broad-spectrum insecticides on natural lands that harbor blunt-nosed leopard lizards—to combat agricultural pest species—may be an additional threat to their survival. It also is threatened by overgrazing and rodent control. Those lands where the species still exists are often heavily grazed or treated with pesticides, both of which have been shown to have detrimental effects on the lizard (Germano and Williams 1992).

The recovery plans for the blunt-nosed leopard lizard identified habitat units that are considered essential for the continued persistence of viable populations within the San Joaquin Valley but, having no legal status equivalent to critical habitat; the conversion of suitable habitat within these units has continued (USFWS 1980, 1985a). Consequently, habitat disturbance, conversion, and fragmentation continue to be the greatest threats to blunt-nosed leopard lizard populations. Other direct and indirect effects result from automobile and off-highway vehicle traffic, livestock grazing, and pesticides (USFWS 1998). The recovery strategy for this species includes identifying and protecting existing habitat, determining the best habitat management practices, and conducting public information and education programs (USFWS 1985a, 1998).

#### *Species Occurrence and Habitat Status in the Action Area*

CNDDDB records of sightings for blunt-nosed leopard lizard have been documented within 5 miles of Project areas. Some observations are duplicative, but observations have been made along the San Luis Canal (13), FKC (2), Coalinga Canal (3), the San Joaquin River Gauging Stations (1), San Joaquin Repeater Station (1), San Luis Drain (3), on lands operated and maintained by California Department of Fish and Game near San Luis Reservoir and at Volta Wasteway Wildlife Area(5), along the DMC (5) and near facilities operated and maintained by the Columbia Conservation Irrigation District (5) near Mendota Pool. Suitable habitat for the blunt-nosed leopard lizard occurs near the San Luis Canal, Coalinga Canal, Joaquin Ridge Repeater Station, and south of Poso Creek along the FKC. Small tracts suitable for BNLL may be present within five miles of the DMC near San Luis Reservoir, the DMC and San Luis Drain near the terminus near Mendota Pool, including the nearby facilities administered by Columbia Conservation Resource District. The likelihood that BNLL would be present and subjected to O&M actions is low as suitable habitat subject to O&M activities is extremely limited.

It is still possible, however, that some blunt-nosed leopard lizards remain especially in the Tulare Irrigation District, Lower Tule Irrigation District, and the Southern San Joaquin Municipal Utility District.

#### California Red-legged Frog

The California red-legged frog (*Rana aurora draytonii*) was listed as federally threatened on May 23, 1996 (61 FR 25813). Critical habitat for the California red-legged frog was designated on March 13, 2001 (66 FR 14625-14674). In a court order dated November 12, 2002, the Service removed most of the critical habitat designation for the species. Critical habitat was subsequently proposed on April 13, 2004 (FR 69:19619). A recovery plan for the California red-legged frog was released in 2002 (Service 2002). The *R. a. draytonii* subspecies was included as

a Category 1 candidate species in the U.S. Fish and Wildlife Service's Annual Notice of Review in November 21, 1991 (USFWS 1991). On June 24, 1996, the California red-legged frog was officially listed as a threatened species (USFWS 1996) based largely on a significant reduction in range and continued threats to surviving populations (Miller 1994).

#### *Life History and Habitat Requirements*

The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), with adults obtaining a length of 3.4 to 5.4 inches from the tip of the snout to the rear of the vent (Jennings and Hayes 1994a). Juvenile frogs are 1.5 to 3.4 inches from the tip of the snout to the rear of the vent and have the same coloration as adults except that the dorsolateral folds are normally yellow or orange colored, especially in very young individuals (Stebbins 1985). Larval frogs range from 0.6 to 3.1 inches in length.

California red-legged frogs are endemic to California and Baja California, Mexico. Although they have been observed in a number of aquatic and terrestrial habitats throughout their historic range, they appear largely restricted to freshwater and slightly brackish water habitats. In lagoon systems and brackish water environments, field and laboratory observations indicate that California red-legged frogs cannot successfully reproduce and that larvae cannot survive (Jennings and Hayes 1990; Jennings, Unpubl. data).

Habitat for California red-legged frog includes various aquatic, riparian, and upland habitats including ephemeral ponds, intermittent streams, seasonal wetlands, springs, seeps, permanent ponds, perennial creeks, man-made aquatic features, marshes, dune ponds, lagoons, riparian corridors, blackberry thickets, annual grasslands, and oak savannas. The species occurs most frequently in intermittent waters that lack bullfrogs and introduced fish species (Hayes and Jennings 1988). The key to the presence of California red-legged frogs in these habitats is the presence of perennial, or near perennial, water and the general lack of introduced aquatic predators such as crayfish (*Pacifastacus leniusculus* and *Procambarus clarkii*), bullfrogs, green sunfish, bluegill (*Lepomis macrochirus*) and centrarchid fishes such as largemouth bass (*Micropterus salmoides*).

California red-legged frogs prefer quiet water areas with pools at least two feet deep and dense riparian or emergent vegetation (Hayes and Jennings 1988, cited in USFWS 2002), but can also occur in artificial ponds that lack emergent vegetation (Scott and Rathbun in litt. 1998, cited in USFWS 2002). The highest densities are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (Jennings 1988, Hayes and Jennings 1988, Jennings and Hayes 1994).

California red-legged frogs disperse upstream and downstream of their breeding habitat to forage and seek shelter. Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and any landscape features that provide cover, including existing animal burrows, boulders or rocks, organic debris such as downed trees and logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hayracks may also be used. Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter; adults

may aestivate during dry periods in rodent holes or leaf litter. Although California red-legged frogs typically remain near streams or ponds, recent information suggests that they are capable of moving 1 mile or more in upland areas or through ephemeral drainages (Zeiner et al. 1988).

Adult California red-legged frogs breed from after the onset of warm rains (Storer 1925, Jennings and Hayes 1994a), from November through July, with earlier breeding occurring in southern localities. In Alameda County, they were found to breed from late January through March during the 1990s (Jennings, pers. observ.).

Male frogs typically call in small mobile groups of three to seven individuals that attract females (Jennings and Hayes 1994a). Females move toward the calling groups and amplex a male. Following amplexus, the females move to oviposition sites where they attach an egg mass of 2,000 to 6,000 moderate-sized (2.0 to 2.8 mm diameter) eggs to an emergent vegetation brace such as tule stalks (*Scirpus* spp.), grasses (*Poaceae*), or willow (*Salix* spp.) roots just below the water surface (Storer 1925, Livezey and Wright 1947) so that the egg masses float on the surface of the water (Hayes and Miyamoto 1984). After reproduction, males usually remain at the breeding sites for several weeks before moving to foraging habitats, whereas females immediately move to those habitats (Jennings, unpubl. data).

Embryos of California red-legged frogs hatch in 6 to 14 days after fertilization and resulting larvae require three and half to seven months to attain metamorphosis at a total length of 2.6 to 3.4 inches (Storer 1925; Jennings, unpubl. data). Larvae are thought to graze on algae, but they are rarely observed because they are often concealed in submergent vegetation or detritus (Jennings and Hayes 1994a). Most larvae metamorphose into juvenile frogs between July and September, although there are scattered observations of over wintering larvae in perennial ponds such as at the arboretum at Golden Gate Park in San Francisco (Jennings, unpubl. data). Juvenile California red-legged frogs are active both during the day and at night, whereas adults are largely nocturnal.

Feeding activity occurs along the shoreline and on the surface of the water. Post-metamorphic frogs grow rapidly by feeding on a wide variety of invertebrates including Amphipods, Isopods, Orthoptera, Isoptera, Hemiptera, Homoptera, Neuroptera, Coleoptera, Lepidoptera, Diptera, Hymenoptera and Arachnids, and Gastropoda (Stebbins 1972, Hayes and Tennant 1985, Baldwin and Stanford 1987). Adult frogs apparently eat a wide variety of animal prey including invertebrates, small fishes, frogs, and small mammals (Hayes and Tennant 1985, Arnold and Halliday 1986).

Most males reach sexual maturity in two years, whereas females reach sexual maturity in three. Frogs of both sexes may reach sexual maturity in a year if resources are sufficient (Jennings, unpubl. data), though it may require three to four years during extended periods of drought (Jennings and Hayes 1994a). Based on limited field data, California red-legged frogs appear to live from 8 to 10 years in the wild (Jennings, unpubl. data).

In warmer areas of their range, California red-legged frogs are probably active throughout most of the year, except during the coldest portions of the winter when temperatures drop below



freezing. California red-legged frogs can disperse through upland habitats far from water. During wet periods, especially in the winter and early spring, red-legged frogs can move a mile between aquatic habitats. Radio-telemetry studies conducted in lagoons and the lower reaches of streams along the Central Coast of California indicate that adult red-legged frogs will move within the riparian zone from well-vegetated areas to pools to hydrate during periods when many of the Central Coast streams are dry except for isolated pools (Rathbun et al. 1993). This movement often occurs across inhospitable frog habitat like roads, open fields, and croplands. This type of movement, which is best documented in mesic coastal areas, may result in frogs occupying aquatic habitats isolated from known frog populations.

During dispersal, California red-legged frogs seek shelter. Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and any landscape features that provide cover, including existing animal burrows, boulders or rocks, organic debris such as downed trees and logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay racks may also be used. Access to sheltering habitat is essential for the survival of California red-legged frogs (Service 2001).

In addition to aquatic habitats, juvenile and adult California red-legged frogs use areas of riparian vegetation within a few yards of water. This species also uses small mammal burrows in or under vegetation, willow root wads, and the undersides of old boards and other debris within the riparian zone (Jennings, pers. obs.). Juvenile frogs are often observed sunning in the warm, surface-water layer associated with floating and submerged vegetation (Hayes and Tennant 1985). Adult frogs are mainly nocturnal and sit on stream banks or low hanging limbs of willow trees above pools where they can detect small mammal prey (Hayes and Tennant 1985, Jennings and Hayes 1994a).

#### *Historical and Current Distribution*

The historic range of the California red-legged frog extended along the coast from the vicinity of Point Reyes National Seashore, Marin County, California, and inland from the vicinity of Redding, Shasta County, California, southward to northwestern Baja California, Mexico. The species has been extirpated from approximately 75 percent of its former range.

California red-legged frogs have been documented in 46 counties in California, but now remain in only 238 streams or drainages in 31 counties. They are still locally abundant along coastal California between the San Francisco Bay area and Ventura County. Within the remaining distribution of the species, only isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico. California red-legged frog population numbers are not precisely known, although the Service believes that many populations are declining throughout the range of the subspecies.

California red-legged frogs currently remain only in the foothills of the Coast Range, in isolated drainages in the Sierra Nevada, and in Oristimba Creek, which flows through the DMC Unit project area. Enhancement of flood control along Oristimba Creek has been proposed and

development may follow. The species historically occurred in the San Joaquin Valley (Jennings and Hayes 1994), but may never have been widespread on the Valley floor (USFWS 2002). California red-legged frogs have been extirpated from the floor of Central Valley and largely extirpated from the Sierra Nevada foothills. In the Sierra Foothills, Jack and Indian Creeks in Butte County and North Fork Weber Creek in El Dorado County still support California red-legged frogs (Service 2001, 2002b). These creeks are upstream from CVP and State Water Project facilities. The species is nearly extirpated in the North Coast Range/West Sacramento Valley with the only potentially remaining population near Clear Lake. The North Coast/North San Francisco Bay area supports significant numbers of California red-legged frogs in small coastal drainages, ponds, and man-made stock ponds in portions of Marin, Sonoma, Solano and Napa counties. The southern and eastern San Francisco Bay similarly appears to support relatively large numbers of California red-legged frogs although the species appears to have been nearly extirpated from lowland portions of Contra Costa and Alameda Counties.

#### *Reasons for Decline and Threats to Survival*

California red-legged frog populations have declined primarily from habitat loss, overharvest for human consumption, and the introduction of bullfrogs and various game-fish species that prey or compete with it (Moyle 1976, Stebbins 2003, Hayes and Jennings 1988). Factors related to declines in populations of red-legged frogs include the degradation or loss of habitat attributed to agricultural practices, introduced plants and animals, livestock grazing, mining, water diversions and impoundments, water quality, recreation activities, timber harvesting, and urbanization (USFWS 2000). In the Central Valley of California alone, more than 90 percent of the historic wetlands have been lost or altered because of agricultural and urban development (Dahl 1990). Some populations, such as those in the San Joaquin Valley, have been particularly adversely affected by historical reclamation of their wetland habitats and harvest (Jennings and Hayes 1994). Although the number of permanent ponds suitable for the species has increased in the central Coast Region with the development of livestock water ponds, most red-legged frog populations are found in intermittent waters. Hayes and Jennings (1988) have suggested that red-legged frog populations may be uncommon in permanent ponds because of the presence of bullfrogs and non-native fishes. Habitat loss and alteration, combined with over exploitation and introduction of exotic predators, were significant factors in the California red-legged frog's decline in the early to mid-1900s.

The California red-legged frog is threatened within its remaining range by a wide variety of human activities, many of which operate concurrently and cumulatively with each other and with natural disturbances (e.g., droughts and floods). Current factors associated with declining populations of the California red-legged frog include; degradation and loss of habitat through urbanization, mining, improper management of grazing, recreation, invasion of nonnative plants, impoundments, water diversions, degraded water quality, and introduced predators. During each life stage, California red-legged frogs are prey for a wide variety of predators. Predators include: Black-crowned night herons (*Nycticorax nycticorax*), bitterns (*Botaurus lentiginosus*), raccoons, garter snakes, bullfrogs, and centrarchid fishes (Jennings and Hayes 1994a, 1994b). Humans, especially children, may capture and harm juvenile and adult frogs, although these occurrences are considered rare (Miller et al. 1996).

Human activities that result in habitat destruction and/or the introduction of exotic competitors such as bullfrogs and green sunfish may have a negative effect on existing Sierra Nevada populations (Moyle 1973). Additionally, organophosphate pesticides from agricultural areas on the San Joaquin Valley floor appear to be transported to the Sierra Nevada on prevailing summer winds, and also could be affecting populations of amphibians that breed in mountain ponds and streams.

Together, these factors have resulted in the isolation and fragmentation of populations within many watersheds. The fragmentation of existing habitat, and the continued colonization of existing habitat by nonnative species, may represent the most significant current threats to California red-legged frogs. The continued survival of red-legged frogs in all aquatic habitats seems to be based on the existence of ponds, springs or pools that are apart from perennial streams. Such habitats provide the continued basis for successful reproduction and recruitment into nearby drainages that may lose frog populations due to stochastic events such as extreme flooding or droughts.

The draft USFWS recovery plan for the California red-legged frog identifies eight "recovery units" that delineate geographic areas where recovery efforts to delist the frog will occur (USFWS 2000). To facilitate recovery, core areas were defined within the recovery units to focus conservation actions (U.S. Fish and Wildlife 2000). These areas represent the areas where restoration is most feasible, reestablishment efforts are most likely to be successful, and natural recolonization is expected (U.S. Fish and Wildlife 2000). Activities within the core recovery areas will focus on; "1) protecting existing populations by reducing threats; 2) restoring and creating habitat that will be protected and managed in perpetuity; 3) surveying and monitoring populations and conducting research on the biology and threats of the subspecies; and 4) reestablishing populations of the subspecies within its historic range" (USFWS 2000).

#### *Species Occurrence and Habitat Status in the Action Area*

The California red-legged frog currently occurs in the foothills and lower reaches of the Coast Range, in isolated drainages in the Sierra Nevada, and in Oristimba Creek, a tributary to the San Joaquin River from the eastern slope of the inner coast range. According to the USFWS (2002), the last verifiable record on the Valley floor was from 1957 in the town of Lodi in San Joaquin County. Potentially suitable habitat still exists in ponds along the San Joaquin River and in flood-control basins throughout the city, but introduced predators and competitors such as bullfrogs (*Rana catesbeiana*) are now abundant at these sites. Within the Project Area, suitable habitat for California red-legged frogs occurs in a variety of aquatic and adjacent upland habitats on the west side of the San Joaquin Valley and at points north and west. There are 80 records of California red-legged frog within five miles of Project lands or facilities from areas in western Fresno, Merced, San Joaquin and Stanislaus Counties, and eastern areas of Alameda, Contra Costa, San Benito and Santa Clara Counties.

The California red-legged frog was historically found throughout Santa Clara County and, likely, San Benito Counties. Currently, in Santa Clara County, California red-legged frogs primarily occur in the foothill and mountain ranges and are rare or extirpated from the urbanized lowlands and the marshlands bordering San Francisco Bay. The situation is probably similar in San Benito

County. In Zone 6 of San Benito CWD, California red-legged frogs have been reported at Tequisquita Slough, Pacheco Creek, Rancho San Benito, Dry Creek Reservoir, and Pajaro River (CNDDDB 2001) and recently in the vicinity of San Justo Reservoir (Newman et al. 2003). California red-legged frogs in Santa Clara County occur within five miles of the Project Area in the vicinity of the Santa Clara Conduit and bifurcation structure. Upland oak woodland and grassland habitat along the Pacheco Conduit is suitable for this species and is likely inhabited. In San Benito County, the Endangered Species Recovery Program (ESRP) monitors a population of California red-legged frogs that was discovered in 1996 in a toe drain pond below San Justo Dam. ESRP conducts monthly site visits and bi-annual surveys of this pond, and is developing an outline for management of this population. Sixty California red-legged frogs were surveyed in this pond in October 2003 (Newman et al. 2003) and there are numerous sightings around San Justo Reservoir and an artificial pond that is habitat for the frogs. O&M activities such as rodent control may reduce the number of burrows available to the frogs using this area.

Suitable California red-legged frog habitat is present along the Contra Costa Canal and the species could occur in permanent and intermittent streams, ponds and wetlands found in this area. The CNDDDB lists 19 occurrences within five miles of the Contra Costa project facilities, mostly in areas upslope of the canal. These frogs may utilize adjacent upland grasslands and riparian communities for summer aestivation and for dispersal. California red-legged frogs have been observed at the Black Diamond Mines Regional park; Mt. Diablo Creek, northeast of Concord; Markley Canyon Creek, west of Pittsburg; south of Willow Pass Road and State Route 4; Keller Canyon, southwest of Pittsburg; and Marsh Creek, southwest of Clayton (CNDDDB 2003). They also occupy intermittent and permanent streams and ponds at Los Vaqueros Reservoir (Service 2000a). Rodent control can reduce burrows and pesticide residues may be toxic if encountered by California red-legged frogs. California red-legged frogs also are known to occur in areas east of the Contra Costa Canal, within five miles of the Tracy Fish Release sites, and upslope of these facilities. Five records of occurrence are listed in the CNDDDB for this area. O&M activities at the fish release sites likely would not affect California red-legged frogs.

Project Areas south and east of the Contra Costa Canal also harbor California red-legged frog. California red-legged frogs are known from 39 records in the CNDDDB for areas primarily along the west side of the DMC, south from the Contra Costa Canal. California red-legged frogs inhabit Oristimba Creek drainage, which crosses underneath the DMC. With large rain events that roil Oristimba Creek, frogs in the watershed may disperse downstream, coming into contact with drain and crossing maintenance activities that keep passageways clear of debris and clutter. Further south, along the San Luis Canal, California red-legged frogs have recently been documented in the Little Panoche Dam Spillway (CDFG 2003). This area can be affected by activities to maintain drainage in conjunction with the California Department of Water Resources. Additional records south of this location in the vicinity of Mercy Hot Springs, in northwestern Fresno County, just west of the San Luis Canal, suggest that maintenance activities for clearing or maintaining waterway channels have the potential to affect California red-legged frogs.

The Sierra Nevada populations are highly restricted and consist of small numbers of individuals. The California red-legged frog is thought to have been extirpated from the area along the FKC

and Madera Canal. This belief is supported by the absence of any occurrences within this area in the CNDDDB. The Friant service area occurs within the Sierra Nevada Foothills Recovery Unit for the frogs, but is outside of the core areas within the recovery unit. The nearest core areas occur in western Merced and Fresno counties west of U.S. Interstate Highway 5 (U.S. Fish and Wildlife 2000). Since the FKC and Madera Canal are outside of these core areas, none of the proposed critical habitat for the red-legged frog occurs within the service area (Federal Register 2000).

Santa Clara County is located within the proposed South/East San Francisco Bay Recovery Unit, which includes the Coyote Creek watershed. Within this Recovery Unit, California red-legged frogs seem to have been nearly eliminated from the urbanized western lowland areas. They still occur in isolated populations in the East Bay foothills and the eastern foothills of the Santa Clara Valley. The Sunol Regional Wilderness and vicinity, a core area for the species, is located nearby, as is Henry Coe State Park, another core area. Coyote Creek is historically known to support California red-legged frogs. Specifically, they were known from the Tennant Road Marsh (CNDDDB 2001) and throughout Coyote Valley.

#### Proposed Critical Habitat for the California Red-Legged Frog

On March 13, 2001, the final rule determining critical habitat for red-legged frogs was published in the Federal Register (USFWS 2001). This rule established 31 critical habitat units based on three primary constituent elements: (a) essential aquatic habitat; (b) associated uplands; and (c) dispersal habitat connecting essential aquatic habitat. In November 2002, the U.S. District Court for the District of Columbia vacated most of the 2001 designation and ordered the Service to publish a new critical habitat proposal. On April 13, 2004, Service re-proposed 4.1 million acres in 28 California counties as critical habitat for the frog (USFWS 2004). This proposed rule basically re-proposes the same areas designated critical habitat in the 2001 final rule.

Service is required to list the known primary constituent elements together with the critical habitat description. Such physical and biological features include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing (or development) of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species (USFWS 2004).

Due to the complex life history and dispersal capabilities of the California red-legged frog, and the dynamic nature of the environments in which they are found, the primary constituent elements described below are found throughout the watersheds that are proposed as critical habitat. Special management, such as habitat rehabilitation efforts (e.g., removal of nonnative predators), may be necessary in the area designated. The proposed critical habitat for the California red-legged frog provides for breeding and non-breeding habitats and for dispersal between these habitats, as well as allowing for expansion of frog populations vital to the recovery of the subspecies. The proposed critical habitat includes: (a) essential aquatic habitat; (b) associated uplands; and (c) dispersal habitat connecting essential aquatic habitat.

Aquatic habitat is essential for providing space, food, and cover, necessary to sustain all life stages of red-legged frogs. It consists of virtually all low-gradient fresh water bodies, including natural and man-made (e.g., stock) ponds, backwaters within streams and creeks, marshes, lagoons, and dune ponds, except deep lacustrine water habitat (e.g., deep lakes and reservoirs 50 acres or larger in size) inhabited by nonnative predators. The subspecies requires a permanent water source to ensure that aquatic habitat is available year-round. Permanent water sources can include, but are not limited to, ponds, perennial creeks, permanent plunge pools within intermittent creeks, seeps, and springs. Aquatic habitat used for breeding usually has a minimum deep water depth of 20 inches, and maintains water during the entire tadpole rearing season (at least March through July). During periods of drought, or less-than-average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but because they support breeding in wetter years these sites would still be considered essential breeding habitat. Ponds that support a small population of red-legged frogs, but are not surrounded by suitable upland habitat, or are cut off from other breeding ponds or permanent water sources by impassable dispersal barriers, do not have the primary constituent elements for proposed California red-legged frog critical habitat.

To be a primary constituent element for California red-legged frog proposed critical habitat, the aquatic components within the designated boundaries must include two or more breeding sites (as defined above) located within 1.25 miles of each other; at least one of the breeding sites must also be a permanent water source; or, the aquatic component can consist of two or more seasonal breeding sites with a permanent non-breeding water source located within 1.25 miles of each breeding site. California red-legged frogs have been documented to travel 2.25 miles in a virtual straight line migration from non-breeding to breeding habitats (U.S. Fish and Wildlife Service 2001a). In addition, breeding sites must be connected by dispersal habitat connecting essential aquatic habitat, described below.

Associated upland and riparian habitat is essential to maintain California red-legged frog populations associated with essential aquatic habitat. The associated uplands and riparian habitat provide food and shelter sites for California red-legged frogs, and assist in maintaining the integrity of aquatic sites by protecting them from disturbance and supporting the normal functions of the aquatic habitat. Key conditions include the timing, duration, and extent of water moving within the system, filtering capacity, and maintaining the habitat to favor red-legged frogs and discourage the colonization of nonnative species such as bullfrogs. Essential upland habitat consists of all upland areas within 300 feet, or no further than the watershed boundary, of the edge of the ordinary high-water mark of essential aquatic habitat (USFWS 2001a).

Essential dispersal habitat provides connectivity among California red-legged frog breeding habitat (and associated upland) patches. While frogs can pass many obstacles, and do not require a particular type of habitat for dispersal, the habitat connecting essential breeding locations and other aquatic habitat must be free of barriers (e.g., a physical or biological feature that prevents frogs from dispersing beyond the feature) and at least 300 feet wide. Essential dispersal habitat consists of all upland and wetland habitat free of barriers that connects two or more patches of essential breeding habitat within 1.25 miles of one another. Dispersal barriers include heavily

traveled roads (an average of 30 cars per hour from 10:00 p.m. to 4:00 a.m.) that possess no bridges or culverts; moderate to high density urban or industrial developments; and large reservoirs more than 50 acres in size. Agricultural lands such as row crops, orchards, vineyards, and pastures do not constitute barriers to California red-legged frog dispersal.

*Dispersal habitat connecting essential aquatic habitat.* Essential dispersal habitat provides connectivity among red-legged frog breeding habitat (and associated upland) patches. While frogs can pass many obstacles, and do not require a particular type of habitat for dispersal, the habitat connecting essential breeding locations and other aquatic habitat must be free of barriers (e.g., a physical or biological feature that prevents frogs from dispersing beyond the feature) and at least 300 feet wide. Essential dispersal habitat consists of all upland and wetland habitat free of barriers that connects two or more patches of essential breeding habitat within 1.25 miles of one another. Dispersal barriers include heavily traveled roads (an average of 30 cars per hour from 10:00 p.m. to 4:00 a.m.) that possess no bridges or culverts; moderate to high density urban or industrial developments; and large reservoirs more than 20 hectares (50 acres) in size. Agricultural lands such as row crops, orchards, vineyards, and pastures do not constitute barriers to red-legged frog dispersal.

The Pacheco Conduit and associated pump stations; the Santa Clara Tunnel; and the Hollister Conduit cross Critical Habitat Unit 15 for the red-legged frog. Activities that could have an affect on critical habitat include excavation for conduit/tunnel repair, contact herbicide application, pre-emergent herbicide application, embankment maintenance, and utility trenching.

Unit 15 (East Bay/Diablo Unit) consists of watersheds within Contra Costa, Alameda, San Joaquin, Santa Clara, Stanislaus, San Benito, Merced, and Fresno Counties. It is 1,053,850 acres in size. Approximately 87 percent is privately owned, while the remaining 13 percent is managed by a variety of federal and state agencies, water districts, or regional park districts. Unit 15 is occupied by several large core subpopulations, including the population within CCWD and East Bay Regional Parks lands, and essential breeding habitat is located throughout the unit.

#### California Tiger Salamander

The Central California Distinct Population Segment (DPS) of the California tiger salamander (*Ambystoma californiense*) was proposed as Threatened on May 23, 2003 (50 FR Part 17). On August 4, 2004, the Fish and Wildlife Service listed the California tiger salamander as threatened throughout its range (FR 69:47211-47248). Concurrently, the status of the Santa Barbara and Sonoma County populations have been downlisted from endangered to threatened. On August 10, 2004, 47 critical habitat units were proposed in 20 counties (FR 69:48569-48649).

#### *Life History and Habitat Requirements*

The California tiger salamander, once thought a subspecies of the tiger salamander (*Ambystoma tigrinum*), is a relatively large salamander up to 8.5 inches (20.7 cm) long. It is stocky with small, protruding eyes that have black irises. It is black above, with large, pale yellow spots that may be scarce or even absent along the middle of the back. Ventral coloration is highly variable and may range from white to pale yellow with occasional banding of black. The snout is rounded and tubercles are present on the undersides of its feet.

The California tiger salamander is restricted to grasslands and open oak woodlands in low foothill regions where lowland aquatic sites are available for breeding. The species will use permanent ponds provided that aquatic vertebrate predators are not present (Stebbins 1954). The elevational range for this species is generally below 1000 ft. although Zeiner et. al. (1988) reported that they may be found up to 4500 ft.

Adult California tiger salamanders spend most of the year in underground shelters, especially ground squirrel burrows. However, they are poor burrowers and they typically aestivate during the dry months in small mammal burrows made by California ground squirrels (*Spermophilus beecheyi*) or Botta's pocket gophers (*Thomomys bottae*) in valley grasslands and open areas of woodland communities. California tiger salamanders are also known to use man-made structures and cracks as refugia, especially during breeding migrations.

Adult salamanders migrate to breeding ponds during late fall and early winter. This seasonal activity is highly correlated to rainfall, with adults emerging from underground during the first heavy winter rains. Emergence and migration generally occurs in the evening, although diurnal activity is seen during the breeding season. Adults may be found under objects such as rocks and logs during breeding migrations.

Breeding occurs from early December through mid-March, resulting in larval metamorphosis and migration from the pond from late May through late July (Storer 1925, Van Vuren 1993). Breeding takes place in temporary pools or permanent ponds that do not contain fish (Petranka 1998), especially natural ephemeral pools or ponds that mimic them (i.e., stock ponds that are allowed to go dry). Streams are rarely used for breeding or egg-laying; preferred breeding habitats are pond environments that can persist a minimum of three to four months on an annual basis.

Females lay as many as 1000 eggs either singly or in small clumps that are attached to submerged vegetation, or directly on the bottom of the pool, if emergent vegetation is lacking. The eggs hatch approximately one week after they are deposited. The aquatic larvae hatch and develop in pools during winter and spring. The larval period usually lasts from three to six months (Petranka 1998). The larvae prey upon invertebrates and other amphibian larvae, during which time they metamorphose into juveniles. Adult California tiger salamanders eat earthworms, snails, insects, fish, and even small mammals.

Juvenile metamorphs leave the pools to disperse into upland habitats during mid-spring to early summer. Juveniles typically leave the pools in mass during a one- to two-week period, usually as the ponds dry. The juveniles then search for available burrows where they feed and grow until the following winter. Newly metamorphosed juveniles from the previous summer that have not reached maturity by the breeding season presumably remain in burrows instead of migrating to ponds like adults. California tiger salamanders take several years to reach maturity and do not necessarily breed every year, even if sufficient habitat is available.



Individuals may move as far as two kilometers between breeding ponds and upland refuge sites (USFWS and CDFG 2003). Adults and juveniles may also undergo dispersal movements within and between upland habitats at any time during the wet season, typically on rainy nights.

Studies on other *Ambystoma* species indicate that the dates of migration and emigration vary as a function of several factors, most importantly annual rainfall pattern, and spring and summer temperatures (Semlitsch 1983, 1985, Semlitsch and Wilbur 1988). Emigration from breeding ponds by metamorphs on the Concord Naval Weapons Station was nocturnal and concentrated between 22:00 and 1:00 (Morrison and Van Vuren, 1993). Morrison and Van Vuren (1993) reported adult salamanders moving further on their migrations out of the breeding pond than juvenile emigrants. Their data supports the hypothesis that salamanders were moving short distances each night for several days or weeks as opposed to making a single extended move. Maximum distances recorded from the center of the pond were 398.5 feet (121.5 m) for adults and 162.4 feet (49.5 m) for juveniles from the same pond (Morrison and van Vuren 1993). Thus, they recommended that 398.5 feet (121.5 m) should serve as the absolute minimum radius of protection from a breeding pond to allow for variation between sites and years, and to protect salamanders that have settled into temporary sites that are likely to be abandoned before the next migration.

#### *Historic and Current Distribution*

The California tiger salamander's current range includes the Great Central Valley of California and adjacent foothill districts as well as the coastal grasslands from the vicinity of San Francisco Bay south at least to Santa Barbara County (Storer 1925, Morey 1988). This species ranges from the vicinity of Petaluma, Sonoma County and Dunnigan, Colusa-Yolo County line, with an isolated outpost north of the Sutter Buttes at Gray Lodge, Butte County in the Central Valley, south to vernal pools in northwest Tulare County, and in the Coast Range south to ponds and vernal pools between Buellton and Lompoc in the Santa Ynez drainage, Santa Barbara County (CDFG 1994b). They are absent through most of western Fresno and Kings Counties. In the San Francisco Bay Area, they may be found from Alameda County south to San Benito County (Service 2003). In the San Joaquin Valley, this species occurs in scattered locations south to Tulare County (Jennings and Hayes 1994, CDFG 2002). The known elevational range of this species extends from 3 to 1054 meters.

There are three distinct population segments of California tiger salamander federally listed as threatened: the Sonoma County DPS, the Santa Barbara DPS and the central California DPS. The central California DPS is separated from the Sonoma County DPS by the Carquinez Straits of the San Francisco Bay, the Napa River, and the coastal mountains between Sonoma County and the Central Valley (Service 2003).

Historically, the central California DPS of the California tiger salamanders occurred in vernal pool and associated upland habitats from the Sonoma, Petaluma, and the Colusa-Yolo county line southward to northern Kern and Tulare counties.

#### *Reasons for Decline and Threats to Survival*

The species has disappeared from a significant portion of its range due to habitat loss attributed

to agricultural practices and urbanization, and the introduction of non-native aquatic predators (e.g. bluegill [*Lepomis macrochirus*], largemouth bass [*Micropterus salmoides*], mosquitofish [*Gambusia affinis*], and bullfrogs [*Rana catesbeiana*]).

Loss of habitat due to farmland conversion and urbanization continue to be major threats to the California tiger salamander's continued existence. Aggressive "pest control" activities which reduce ground squirrel populations also contribute to reduced numbers of California tiger salamanders as a result of loss of aestivation habitat. In the San Joaquin Valley it is threatened primarily by loss of breeding habitat and by predation on larvae by introduced fishes (Jennings and Hayes 1994).

#### *Species Occurrence and Habitat Status in the Service Areas*

Suitable habitat for California tiger salamander occurs throughout the Project Area. There is suitable upland and wetland habitat, particularly along the FKC, Madera Canal, Delta Mendota Canal (DMC), Pacheco Conduit, San Luis Conduit, San Benito Conduit, DMC and San Luis Canal. Aestivation sites, ditches, stock ponds and upland vernal pool habitats are present at various locations along these facilities. The most extensive vernal pool habitat is found along the Madera Canal, the upper 1/3 reach of the FKC and adjacent to the DMC and near the origin of the DMC and the Contra Costa Canal.

The distribution of California tiger salamander in the Project Area is similar to that of California red-legged except that California tiger salamanders are present on the east side of the San Joaquin Valley, especially along the Madera Canal and along the upper reaches (concentrated in approximately the upper 1/3) of the FKC. California tiger salamanders may occur in the Central Valley, primarily inhabiting natural areas, particularly in vernal pools in the Grasslands Out outside of native habitats they are not common in the valley floor. Unlike California red-legged frog, California tiger salamanders are not expected to occur adjacent to the lower San Luis and Coalinga Canals, where more xeric conditions exist and fewer suitable wetland habitats are available.

Pools, ponds, stock ponds, drainage ponds, and natural wetlands in grassland and scrub communities that can provide habitat for this species are present along the Contra Costa Canal. Urbanization is expanding rapidly in Contra Costa County and has encroached on habitat. There are 25 CNDDDB records within five miles of the Project Area along the CC Canal, mostly in areas upslope in hilly areas along the Canal in grassland habitat. The CNDDDB records are concentrated around the Contra Costa County/Alameda County line and the Los Vaqueros Reservoir, near the Keller Canyon Landfill, and along Marsh Creek Road, south of Antioch (CNDDDB 2003).

There are 76 records of California tiger salamander within five miles of Project Areas operated and maintained by FWUA, including the FKC, Bear Mountain Repeater Station, and San Joaquin River Gauging Stations. Of these, 24 are associated with the gauging stations along the San Joaquin River, 6 are associated with the Bear Mountain Repeater site and 36 are within five miles of the FKC. Along the Madera Canal, there are 47 records in the CNDDDB. Within five miles there are six records.

Most of these records are associated with grassland, open oak woodland habitat and aquatic sites such as stock ponds, vernal pools and other ephemeral wetlands, although some occur in areas that have been altered and are now agricultural or other uses and no longer provide suitable habitat, especially for those sightings that are lower down in the valley floor. However, much of the lands adjacent to the upper reaches of the FKC and the upslope areas along the Madera Canal provide grazing land. Beecheyi ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) are present throughout these grasslands and create burrow habitat that may be used by California tiger salamanders.

Urbanization of land in the foothills, around Lake Millerton, above the FKC and along the Madera Canal are contributing to loss of habitat for this species on the east side of the San Joaquin Valley. Although canal, ditch and equalizing reservoir habitats are not likely suitable for reproduction, ephemeral stream courses crossing the Friant and Madera Canals and ponds or channels associated with them may be utilized by this species for breeding or feeding. Loss of upland grassland habitat is occurring on land adjacent to existing urban areas such as in the City of Fresno (CDFG 2004), or in new developments that are planned or occurring in the vicinity of Millerton Lake and in Madera County.

The interior inner Coast Range in Santa Clara and San Benito Counties provides upland and breeding habitat for California tiger salamander in grasslands, oak woodland and with associated ephemeral wetlands and ponds. There are 41 CNDDDB records that are noted within five miles of the Santa Clara Conduit, Pacheco Conduit, Pacheco tunnel, and Bifurcation Structure. There are 26 records noted within five miles of the Hollister Conduit and San Justo Reservoir. Grassland, oak woodland habitat predominates along routes for the Pacheco Conduit, Pacheco Tunnel and upper reaches of the Santa Clara Conduit. Grassland, agricultural land and urban development are more prominent features along the lower end of the Santa Clara Conduit and along the Hollister Conduit where it passes through or adjacent to the City of Hollister.

In Santa Clara and San Benito Counties, records are found throughout the Project Area, along the Santa Clara Conduit in the vicinity of Lake San Felipe, near the Bifurcation Structure, west of Coyote Pumping Station, near San Justo Reservoir and east of the City of Hollister. A golf course and stock operations provide ponds that may be breeding habitat, west of San Justo Reservoir. Additionally, an artificial pond just below the San Justo Reservoir on Reclamation lands that is maintained for California red-legged frog also may provide breeding habitat. Lands adjacent to the Project Area in San Benito and Santa Clara County are likely less subject to development pressures from urbanization than those in Contra Costa County, possibly because of nearby land uses (grazing and agricultural lands) and terrain or distance from other urban areas. Exceptions to this are the areas west of Coyote Pumping Plant and adjacent to the city of Hollister.

California red-legged frogs are also found along the DMC and the San Luis Drain, with 44 and 9 records from the CNDDDB for these areas, respectively. Records along the Drain are associated with habitat in the Grasslands, whereas many records along the DMC are clustered west of the head of the canal and of the California Aqueduct. Much of this land in the Grasslands is either

grazed or protected in easements for wetlands. Land around the head of the DMC is grazed, but is closer to urban growth centers.

Proposed Critical Habitat for the California Tiger Salamander

Critical habitat for the California tiger salamander was proposed on August 10, 2004 (USFWS 2004). The Service divided the current range of the Central population into four regions: (1) Central Valley; (2) Southern San Joaquin Valley; (3) East Bay; and (4) Central Coast. The project area is located in the East Bay and Southern San Joaquin regions.

The Service determined that conserving the California tiger salamander over the long-term requires a five-pronged approach: (1) Maintaining the current genetic structure across the species range; (2) maintaining the current geographical, elevational, and ecological distribution; (3) protecting the hydrology and water quality of breeding pools and ponds; (4) retaining or providing for connectivity between locations for genetic exchange and recolonization; (5) protecting sufficient barrier-free upland habitat around each breeding location to allow for sufficient survival and recruitment to maintain a breeding population over the long-term (USFWS 2004).

The Service believes that areas proposed for critical habitat may require certain management considerations or protections due to the following threats: (1) Activities that introduce or promote the occurrence of bullfrogs and fish; (2) Activities that could disturb aquatic habitats during the breeding season; (3) Activities that impair the water quality of aquatic breeding habitats; (4) Activities that would reduce small mammal populations to the point that there is insufficient underground Central population refugia used for foraging, protection from predators, and shelter from the elements; (5) Activities that create barriers impassible for salamanders or road crossings that increase mortality in upland habitat between extant occurrences in breeding habitat; (6) Activities on adjacent uplands that disrupt vernal pool complexes' ability to support California tiger salamander breeding function; (7) Activities that introduce non-native tiger salamanders in areas where the California tiger salamander is threatened with hybridization (USFWS 2004).

In determining which areas to designate as critical habitat, the Service considers those physical and biological features (primary constituent elements) that are essential to the conservation of the species, and that may require special management considerations and protection (50 CFR § 424.14). The Service lists the known primary constituent elements together with the proposed critical habitat description. Such physical and biological features include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing (or development) of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

The primary constituent elements for the California tiger salamander are aquatic and upland areas, including vernal pool complexes, where suitable breeding and non-breeding habitats are interspersed throughout the landscape, and are interconnected by continuous dispersal habitat.

All areas proposed as critical habitat for the central population contain one or more of the primary constituent elements (USFWS 2004).

*Breeding Habitat.* Standing bodies of fresh water, including natural and man-made (e.g. stock) ponds, vernal pools, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a sufficient length of time necessary for the species to complete its life cycle (USFWS 2004).

Breeding California tiger salamander are found in vernal pools, vernal pool complexes, and seasonal ponds in associated annual grasslands, oak savannah, and coastal bay scrub plant communities of the Bay Area (Santa Clara Valley), Central Coast, Central Valley, and Southern San Joaquin Valley. The California tiger salamander also have adapted to using artificial water bodies, such as stock ponds during their aquatic phase. However, stockponds are often not optimum breeding habitat because the hydroperiod is so short there is not sufficient time for larvae to metamorphose, or it is so long that predatory fish and bullfrogs can colonize the pond. Permanent wetlands can support breeding California tiger salamander if fish are not present, but extirpation of the salamander is likely to occur if fish are introduced. Periodic maintenance to remove silt from stockponds and other artificial waterbodies may also cause a temporary loss of functioning aquatic habitat. Regardless of vernal pool, pond, or seasonal wetland type, successful breeding ponds for California tiger salamander need to be inundated for a minimum of 21 weeks to allow for successful metamorphosis (USFWS 2004).

*Non-Breeding Habitat.* California tiger salamanders spend the majority of their lives in barrier-free upland habitats adjacent to breeding ponds. Within these upland habitats, adult California tiger salamander spend part of their lives in the underground burrows of mammals, especially the burrows of the California ground squirrel and valley pocket gopher, with depths ranging from 20 centimeters to 1 meter beneath the ground surface. Small mammals are essential in creating the underground habitat that adult California tiger salamander depend on for food, shelter, and protection from the elements and from predation. Although California tiger salamander are members of a family of burrowing tiger salamanders, California tiger salamander are not known to create their own burrows in the wild and require small mammal burrows for survival. The upland component of the Central population habitat typically consists of vernal pool grassland or grassland savannah with scattered oak trees. Some occupied California tiger salamander breeding ponds exist, however, within mixed grassland and woodland habitats, in woodlands, scrub, or chaparral habitats (USFWS 2004).

*Dispersal and Migration.* Movements made by California tiger salamander can be grouped into two main categories: (1) Breeding migration, and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years (on average, four years). Upon reaching sexual maturity, most individuals return to their natal (birth) pond to breed, while 20 percent disperse to other ponds (USFWS 2004).

Essential dispersal habitats generally consist of upland areas adjacent to essential aquatic habitats

which are not isolated from other essential aquatic habitats by barriers that California tiger salamander cannot cross. Essential dispersal habitats provide connectivity among California tiger salamander suitable aquatic and upland habitats. While California tiger salamander can bypass many obstacles, and do not require a particular type of habitat for dispersal, the habitats connecting essential aquatic and upland habitats need to be free of barriers (e.g. a physical or biological feature that prevents salamanders from dispersing beyond the feature) to function effectively (USFWS 2004).

The Service proposed critical habitat that allowed for dispersal between extant occurrences within 1.13 kilometers of each other. This distance was selected because it provides for 99 percent of the chances that individual salamanders can move and breed between extant occurrences, and, thereby, provides for genetic exchange between individual within the region (USFWS 2004).

The Hollister Conduit crosses East Bay Region Critical Habitat Critical Habitat Unit 12 for the California tiger salamander. The San Justo Dam and associated facilities are also in East Bay Region Critical Habitat Unit 12. The right-of-way for the Madera Canal passes through Southern San Joaquin Region Critical Habitat Unit 1 and the right-of-way for the Friant-Kern Canal passes through Southern San Joaquin Region Critical Habitat Unit 2.

#### *East Bay Region*

**Unit 12** (San Felipe Unit) represents the distribution of the California tiger salamander within the central portions of the Bay Area region and Central Coast vernal pool region.

#### *Southern San Joaquin Valley Region*

**Unit 1** (Millerton Unit) represents the only extant occurrences of the California tiger salamander on the northern end of the Southern San Joaquin Valley Region. This proposed unit occurs within the Southern Sierra Foothills vernal pool region, one of the two vernal pool regions in the Southern San Joaquin Valley Region.

**Unit 2** (Northeast Fresno Unit) represents the distribution of the California tiger salamander in the northern end of the Southern San Joaquin Valley Region and the Southern Sierra Foothills vernal pool region.

#### Giant Garter Snake

The giant garter snake (*Thamnophis gigas*) was listed as threatened on October 20, 1993 (USFWS 1993). No critical habitat has been designated. A draft recovery plan for the giant garter snake was released in 1999 (USFWS 1999).

#### *Life History and Habitat Requirements*

The giant garter snake is the largest member of the genus *Thamnophis*, growing to lengths of 4.5 feet or greater. The giant garter snake is one of the largest garter snakes, reaching a total length of at least 63 inches. Females tend to be slightly longer and proportionately heavier than males. Female giant garter snakes typically weigh 1-1.5 pounds. Dorsal background coloration varies

from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light colored lateral stripes. Background coloration and prominence of a black-checkered pattern and the three light stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

The giant garter snake is endemic to Central Valley wetlands, inhabiting freshwater marshes; sloughs; ponds; small lakes; and low-gradient waterways, such as small streams, irrigation and drainage canals, and rice fields. Giant garter snakes spend most of their active lives near slow-moving streams or sloughs that support stands of emergent vegetation for cover, and prey on species such as small fish and invertebrates (Stebbins 2003). The habitat components most important to the survival of giant garter snakes are: 1) water, including permanent water that persists through the summer months, 2) emergent aquatic vegetation and steep, vegetated banks for cover, and 3) an abundant food supply. Other important components are adjacent upland areas with small mammal burrows or other suitable winter retreats and habitat diversity including water. Giant garter snakes are absent from large rivers and other water bodies that support introduced populations of large, predatory fish; wetlands with sand, gravel, and rock substrates; and natural and artificial waterways where weeds are controlled routinely, either mechanically or chemically, and where bank soils are compacted regularly. Giant garter snakes are usually also absent from riparian woodlands because the woodlands have excessive shade and lack basking areas and prey populations (Hansen and Brody 1980).

Giant garter snakes feed primarily on small fishes, tadpoles, and frogs. Habitat requisites consist of (1) adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for cover and refuge from flood waters during the snake's dormant season in the winter.

The giant garter snake inhabits small mammal burrows and other soil crevices above prevailing flood elevations throughout its winter dormancy period (November to mid-March). Giant garter snakes typically select burrows with sunny exposure along south and west facing slopes. They emerge from over winter retreats in late March or early April and are active until the end of October. Mating occurs from April to May with females subsequently bearing from 10 to 46 live young in August (Fisher et al. 1994).

The breeding season extends through March and April, and females give birth to live young from late July through early September. Brood size is variable, ranging from 10 to 46 young, with a mean of 23. Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size within the first year. Sexual maturity averages three years for males and five years for females.

Due to this loss of the snake's historical habitat, the giant garter snake's typical habitat today is valley floor canals and permanent and seasonal tule-cattail marshes. Giant garter snakes are also

found in flooded rice fields, streams, and sloughs, especially with muddy bottoms (Stebbins 1985). Giant garter snakes could also utilize rock piles, small mammal burrows, and other suitable sites adjacent to the water conveyance systems as hibernacula.

#### *Current and Historic Distribution*

Historically, the giant garter snake inhabited the estimated 4.1 million acres of flood basins, freshwater marshes, and small tributary streams along the length of the Central Valley. Although the boundaries of its original distribution is uncertain, Fitch (1941) described the historical range of the giant garter snake as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield, in Kern County. Service currently recognizes 13 separate distinct populations of the giant garter snake: (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin/ Willow Slough, (6) Yolo Basin/Liberty Farms, (7) Sacramento Basin, (8) Badger Creek/Willow Creek, (9) Caldoni Marsh, (10) East Stockton-Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrel/Lanare.

By the 1970s, the range of the giant garter snake was reduced to the lowlands of the Central Valley from northern Butte County to southern Fresno County. Surveys conducted in the mid-1970s identified 12 distinct giant garter snake populations within the species' entire range. Intensive surveys repeated in the mid-1980s failed to identify any snakes in seven of the previously known locations, but three unknown populations were found (USFWS 1993).

Although surveys have been recently conducted to determine presence or absence, little is known about the habitat requirements of giant garter snakes in the San Joaquin Valley. These habitat requirements are presumably different from those of giant garter snakes in the Sacramento Valley because of environmental differences between the two areas (i.e. soil, vegetation, climate, and water quality, [USFWS 1999]).

Surveys performed in 2001 confirmed the presence of giant garter snake in the Mendota wildlife area (C. Dickert, pers. comm.). Historically, the giant garter snake inhabited the estimated 4.1 million acres of flood basins, freshwater marshes, and small tributary streams along the length of the Central Valley. The drainage of wetlands for agriculture produced substantial losses of habitat. Drainage of Tulare and Buena Vista Lakes between 1940 and 1950 resulted in the extirpation of giant garter snakes from Kings, Tulare, and Kern Counties (Hansen and Brode 1980).

In 1998 a partnership between the U.S. Geological Survey (USGS), California Department of Fish and Game (CDFG), U.S. Fish & Wildlife Service (USFWS), and the Grassland Water District (GWD) conducted giant garter snake surveys within Merced and Fresno Counties, specifically the Mendota Wildlife Area (MWA) and Grassland Ecological Area (GEA), with the latter encompassing several wildlife areas. Giant garter snakes were found in the GEA, but not in the MWA during this 1998 study (Dickert 2003). Surveys conducted by CDFG every year since 1999 (except 2002) have found giant garter snakes within these study sites, although snakes are not always found in the same sites from year to year (Dickert 2002). In 2003 CDFG is surveying the Volta Management Area, the China Island Unit of the North Grassland Wildlife



Area, and the Kesterson Unit of the San Luis National Wildlife Refuge (CDFG 2003).

*Reason for Decline and Threats to Survival*

The biggest risk to the persistence of viable populations of giant garter snakes is the continued conversion of its habitat through development (Fisher et al. 1994). Historically, the giant garter snake inhabited the estimated 4.1 million acres of flood basins, freshwater marshes, and small tributary streams along the length of the Central Valley. The drainage of wetlands for agriculture produced substantial losses of habitat. Drainage of Tulare and Buena Vista Lakes between 1940 and 1950 resulted in the extirpation of giant garter snakes from Kings, Tulare, and Kern Counties (Hansen and Brode 1980).

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Agricultural and flood control activities have extirpated the giant garter snake from the southern one third of its range (USFWS 1999). The drainage of wetlands and reclamation for agriculture produced substantial losses of habitat. The drainage of Tulare and Buena Vista Lakes between 1940 and 1950 resulted in the extirpation of giant garter snakes from Kings, Tulare, and Kern Counties (Hansen and Brode 1980). Remaining valley wetland habitats continue to be degraded by toxic chemicals associated with agricultural, industrial, and urban runoff.

The survival of giant garter snake populations are currently threatened by selenium contamination, introduction of predatory game fish and bullfrogs, loss and alteration of habitat associated with agriculture and urban development, and road kills. The isolation of the 13 extant populations from each other without protected dispersal corridors make the species vulnerable to extirpation by random, naturally occurring environmental events, population dynamics and genetic processes.

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Additional threats to the snake's existence are the elimination of the snake's prey items such as tadpoles, frogs, and small fish by pesticides and fertilizers, spills of pollutants into waterways, introduced predators, and incompatible grazing regimes (Fisher et al. 1994). Predation may also be an important factor in the giant garter snake's decline. Predatory fish that have been introduced throughout the Central Valley compete with and prey on giant garter snakes. The introduction of non-native predatory fish species and the bull frog has reduced the suitability of nearly all permanent and semipermanent waters in the Central Valley (USFWS 1993).

*Species Occurrence and Habitat Status in the Project Areas*

Suitable wetland habitat is present on the west side of the central valley in the Project Area, along the DMC and associated wasteways, San Luis Drain, Volta Wasteway Wildlife Area. Additional habitat is present along the eastern end of the Contra Costa Canal. There are 32 records within five miles the San Luis Drain, 12 records within five miles of the DMC, 11 records in the vicinity of Volta Wasteway Wildlife Area, five along the Columbia-Mowry facilities, two each along the San Luis Canal, Contra Costa Canal and one within five miles of the DMC Sumps.

The most suitable habitat occurs on private and public lands along the San Luis Drain. Additionally, a population of Giant Garter Snakes occurs on Volta Wasteway Wildlife Area and surveys have regularly detected them on Mendota Pool. Other records are scattered across in the Project Area on the west side of the valley.

Giant garter snakes have been observed repeatedly near the Santa Fe Grade, north of Los Banos. Giant garter snakes have survived in a few wetlands managed as duck-hunting preserves or waterbird sanctuaries along the San Joaquin River, but the flooding of state and federal preserves in winter and spring, and draining by summer is opposite of what these snakes require (Fisher et al. 1994). In the northern Sacramento Valley, rice fields may provide the best habitat for these snakes, but the acreage dedicated for rice production is dependent on market conditions and water availability (Fisher et al. 1994).

San Joaquin Kit Fox

The San Joaquin kit fox (*Vulpes macrotis mutica*) was listed as endangered on March 11, 1967 (USFWS 1967). Recovery of the San Joaquin kit fox is discussed in the Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1998).

*Life History and Habitat Requirements*

The evolutionary and taxonomic relationships among small North American foxes were recently examined (Dragoo et al. 1990, Mercure et al. 1993) and the conclusion was made that of the traditional subspecies of the kit fox, the San Joaquin Valley population is most distinct and should be considered a subspecies.

The San Joaquin kit fox (kit fox) is the smallest fox in North America. The San Joaquin kit fox inhabits valley bottoms and surrounding rolling foothills. Preferred areas are prairies, grasslands, alkali sinks, and areas with San Joaquin saltbush. They avoid areas with hard soil, shallow bedrock, or high water tables. Areas with low to moderate relief, moderate slope, and loose-textured soils are chosen for denning. Dens are used for temperature regulation, rearing young, shelter from adverse weather and protection from predators. Kit foxes either dig their own dens, use those constructed by other animals, or use human-made structures (culverts, abandoned pipelines, or banks in sumps or roadbeds). Kit foxes often change dens and many dens may be used throughout the year.

San Joaquin kit foxes require dens for shelter and reproduction, and prefer areas with friable soil for excavating dens. They may also use dens constructed by other animals, or use human-made

structures such as culverts or abandoned pipelines (B. Cypher pers. comm., cited in USFWS 1998). Kit foxes often change dens and may use several dens throughout the year. In the southern part of its range, they feed mostly on kangaroo rats (*Dipodomys* spp.), pocket mice (*Perognathus* spp.), white-footed mice (*Peromyscus* spp.), and other nocturnal rodents (USFWS 1998).

San Joaquin kit foxes (*Vulpes macrotis mutica*) occur in seasonal wetland, alkali desert scrub, grassland, and valley foothill hardwood habitats (USFWS 1983). Before the rapid expansion of irrigated agriculture in the San Joaquin Valley, the alkali desert scrub association was probably the species' prime habitat (Grinnell et al. 1937). Kit foxes are primarily nocturnal and carnivorous. Major prey species include kangaroo rats, black-tailed hares, desert cottontails, deer mice, and California ground squirrels. Although kangaroo rats are a dominant prey species in the San Joaquin Valley (USFWS 1983), California ground squirrels are the most important prey species in some other portions of the kit fox's range (Balestreri 1981; Hall 1983; O'Farrell et al. 1981; Clifton 1989). Kit foxes apparently do not require drinking water (Egoscue 1956; Morrell 1972).

Diet of the kit fox varies geographically, seasonally and annually, based on abundance of prey. In the southern part of its range, the kit fox's diet consists primarily of kangaroo rats (*Dipodomys* sp.), pocket mice (*Perognathus* sp.), white-footed mice (*Peromyscus* sp.) and other nocturnal rodents. In the northern portion of the range (San Joaquin, Alameda and Contra Costa Counties), kit foxes most often prey on California ground squirrels (*Spermophilus beecheyi*). Kit foxes also prey on black-tailed hares (*Lepus californicus*), San Joaquin antelope squirrels (*Ammospermophilus nelsoni*), desert cottontails (*Sylvilagus audubonii*), ground-nesting birds and insects.

The size of the kit fox home range varies from 640 to 1,280 acres, with substantial overlap among individuals (Morrell 1972). The foxes usually inhabit areas with loose-textured soils suitable for den excavation (USFWS 1983). Where soils make digging difficult, the foxes frequently use and modify burrows built by other animals (Orloff et al. 1986). Structures such as culverts, abandoned pipelines, and well casings may also be used as den sites (USFWS 1983).

Kit foxes can breed when one year old. Adult pairs stay together all year. During September and October, females begin to clean and enlarge their pupping dens. Mating occurs between December and January. Litters of two to six pups are born in February or March. Pups emerge from the den after about a month. Breeding occurs from December through February with pups usually born in February or March. One litter per year, with an average of four pups per litter, is typical (McGrew 1979). The pups remain with the parents until June or July at which time the juveniles usually disperse distances of 1 to 7 kilometers (0.6 to 4.4 miles). A six year study at Elk Hills Naval Petroleum Reserves in California reported average dispersal distances of  $8 \pm 1.4$  kilometers ( $5.0 \pm 0.9$  miles; Scrivner et al. 1987; see Williams 1997).

The San Joaquin kit fox is primarily nocturnal and typically occurs in annual grassland or mixed shrub/grassland habitats throughout low, rolling hills and in the valleys. The diet of kit foxes varies geographically, seasonally, and annually, but throughout most of its range the diet consists

primarily of kangaroo rats (*Dipodomys* spp.), pocket mice (*Perognathus* spp.), white-footed mice (*Peromyscus* spp.), San Joaquin antelope squirrels (*Ammospermophilus nelsoni*), California ground squirrels (*Spermophilus beecheyi*), rabbits (*Sylvilagus* spp.), black-tailed hares (*Lepus californicus*), ground nesting birds, and insects, (Morrell 1972, Orloff et al. 1986, Scrivner et al. 1987, Cypher and Spencer 1998).

In arid regions, herbivores are dependent on annual plant production that is strongly influenced by the rates and timing of precipitation (Beatley 1969). While vegetation responds rapidly to precipitation in these systems, small mammal populations may take up to a year to exhibit a numerical response. Kit fox abundance specifically relates to rainfall amounts during the growing season for plants two years earlier (Dennis and Otten 2000) because another lag exists between the increase or decline in herbivore populations and the regulation of kit fox populations (Cypher and Scrivner 1992, White and Garrott 1997) expressed chiefly as variation in annual adult reproductive success and survival (White and Ralls 1993, White et al. 1996).

Home range is the area an animal regularly frequents in its daily activities of foraging, roaming, resting, and caring for young. For carnivores in general, home range size is usually related to prey availability. The home range size of kit foxes in the southern portion of their range is about 2.6 to 2.9 km<sup>2</sup> (1 to 2 mi<sup>2</sup>), and individual home ranges overlap extensively (Morrell 1972, Ralls et al. 1990, Spiegel and Bradbury 1992). Kit foxes may be solitary from mid-summer through late fall and then occur in family groups from late fall through early summer. According to K. Ralls (USFWS 1998), adult pairs may share home ranges but not necessarily the same den outside of the breeding season.

Densities of San Joaquin kit foxes are influenced by the quantity, suitability, and configuration of habitats, and annual variability in precipitation. Density estimates are also subject to variability as a result of differences in methodology, observer bias, and natural background variation. Density estimates taken alone can also be misleading because they provide no information about the reproductive success or age structure within the population. The best long-term data available is for the Naval Petroleum Reserve in California. Williams et al. (1998) reported that the mean densities, from 1981 to 1993, for Reserve-1 and Reserve-2 were 0.12 per km<sup>2</sup> and 0.38 per km<sup>2</sup>, respectively. In both locales, the maximum density was 0.72 per km<sup>2</sup>.

The kit fox requires underground dens for temperature regulation, shelter, reproduction, and predator avoidance (Golightly and Ohmart 1984). Kit foxes commonly modify and use dens constructed by other animals and human-made structures (Williams et al. 1998). Dens are usually located on loose-textured soils on slopes less than 40 degrees (O'Farrell et al. 1980), but the characteristic of San Joaquin kit fox dens varies across the fox's geographic range in regard to the number of openings, shape, and the slope of the ground on which they occur (Williams et al. 1998). Natal or maternal dens tend to be found on slopes of less than six degrees (O'Farrell and McCue 1981). Kit foxes change dens often using numerous dens each year. Monitoring the movement of foxes using radio telemetry portrayed that foxes use individual dens for a median of 2 days before moving to a different den (Williams et al. 1998). Avoidance of coyotes has been provided as a probable hypothesis to explain this frequent change of dens. Orloff et al. (1986) reported individual foxes using more than 20 den sites annually and family groups using as many

as 43. In another study, a single animal used 70 different dens over a two-year period (Williams et al. 1998).

#### *Historic and Current Distribution*

Grinnell et al. (1937) believed that by 1930 the range of the San Joaquin kit fox had been reduced by half. They described the range prior to 1930 as including most of the San Joaquin Valley from southern Kern County north to Tracy in San Joaquin County on the west side of the Valley and up to La Grange in Stanislaus County on the east side. No comprehensive survey of its entire historical range has been completed, but local surveys, research projects, and incidental sightings indicate that kit foxes currently inhabit larger "areas of suitable habitat on the San Joaquin Valley floor and in the surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi Mountains from southern Kern County north to Contra Costa, Alameda, and San Joaquin counties on the west, and near La Grange, Stanislaus County on the east side of the Valley (Williams et al. 1998). Williams et al. (1998) also reported kit foxes occurring "westward into the interior coastal ranges in Monterey, San Benito, and Santa Clara counties (Pajaro River Watershed), in the Salinas River watershed, Monterey and San Luis Obispo counties, and in the upper Cuyama River watershed in northern Ventura and Santa Barbara counties and southeastern San Luis Obispo County. Williams et al. (1998) report the results of a study conducted by the State of California that found about 85 percent of the San Joaquin kit fox population in 1975 occurred within six counties: Fresno, Kern, Kings, Monterey, San Luis Obispo, and Tulare. About half the population could be found in Kern (41%) and San Luis Obispo (10%) Counties.

Before 1930, the San Joaquin kit fox's range extended from Contra Costa and San Joaquin Counties in the north, south to Kern County (Grinnell et al. 1937). Surveys from 1969 through 1975 extended the range to three additional counties: Monterey, Santa Clara, and Santa Barbara. The population is currently estimated to comprise about 7,000 individuals. The northern portion of the range consists of San Joaquin, Alameda, and Contra Costa Counties. Sightings of San Joaquin kit fox in the northern portion of their range are sporadic and are frequently unreported. However, within the last few years, San Joaquin kit foxes have been reported at Black Diamond Preserve, south of the Contra Loma Regional Parks, and in the Los Vaqueros watershed, Contra Costa County (USFWS 1998).

The San Joaquin kit fox inhabits three major communities in the northern part of its range: foothill grasslands, oak savannah, and adjacent agricultural lands (US Fish and Wildlife Service 1999). In addition to suitable habitat, the species requires loose-textured, sandy soils for burrowing and a suitable prey base (CNDDDB 2003). Dens are used for temperature regulation, shelter, reproduction, and escape from predators (Service 1998). San Joaquin kit foxes usually inhabit areas with loose-textured soils suitable for den excavation (US Fish and Wildlife Service 1983). In portions of their range where soils are difficult to dig, they frequently use and modify burrows built by other animals (Orloff et al. 1986). San Joaquin kit foxes also den in structures, such as culverts, abandoned pipelines, and well casings (Service 1983; Berry et al. 1987; Spiegel et al. 1991; Jones & Stokes Associates 1995; Spiegel et al. 1996). Dens are usually located on relatively flat terrain or on the lower part of slopes; however, the topography at den sites varies within the San Joaquin kit fox's range. The diet of San Joaquin kit foxes varies geographically; in the northern portion of their range, the species consumes California ground squirrels most

frequently, with cottontails, black-tailed hares, pocket mice (*Perognathus* sp.; *Chaetodipus* sp.), and kangaroo rats (*Dipodomys* sp.) eaten less often (Service 1998).

This subspecies once inhabited most of the San Joaquin Valley from Kern County north to San Joaquin County (Grinnell et al. 1937, cited in USFWS 1998). The range of the San Joaquin kit fox is believed to have extended from southern Kern County north to Contra Costa County on the west side of the San Joaquin Valley and to near La Grange, Stanislaus County, on the east side. By 1930, the kit fox range had been reduced by more than half, with the largest portion remaining in the southern and western parts of the San Joaquin Valley. Until the 1990s, Tracy was the farthest northwest record. There are now records from the Antioch area of Contra Costa County. The kit fox population is fragmented, particularly in the northern part of the range.

The largest extant population of kit foxes in the Valley is in western Kern County, but they may also occur in scattered areas of natural habitat in Fresno and Madera counties (USFWS 1998). The species inhabits semiarid communities of the San Joaquin Valley and adjacent foothill grasslands and open canopied woodlands. Current range extends from Contra Costa and San Joaquin counties in the north, south to Kern and Santa Barbara counties.

The species has disappeared from much of its former range as natural habitat has been converted to agriculture and urban development. Kit fox populations are becoming increasingly disjunct and fragmented (Koopman et al. 2000). In some areas, kit foxes have adapted to agricultural and even urban environments that provide sufficient food, den sites, and protection from predators (Cypher and Frost 1999).

#### *Reasons for Decline and Threats to Survival*

Loss of habitat is the major threat to the San Joaquin kit fox. Much of the San Joaquin Valley's original natural communities have been lost due to extensive land conversions, intensive land uses, and the use of pesticides. Today many of these communities are represented only by small, degraded remnants. Loss and degradation of habitat by agricultural, industrial, and urban developments decrease the carrying capacity of remaining habitat and threatening kit fox survival. Such losses contribute to kit fox declines through displacement, direct and indirect mortality, barriers to movement, and reduction of prey populations. Kit foxes are subject to competitive exclusion or predation by other species, such as the nonnative red fox (*Vulpes vulpes*), coyote (*Canis latrans*), domestic dog (*Canis familiaris*), bobcat (*Felis rufus*), and large raptors. They are subject to predation by coyote and other larger carnivores.

The San Joaquin kit fox population has declined primarily because of habitat loss to agricultural, urban, industrial, and mineral development in the San Joaquin Valley (USFWS 1983). In 1979, only 6.7 percent of the native habitats in the San Joaquin Valley south of Stanislaus County remained untilled or undeveloped (O'Farrell et al. 1981). Road kills, illegal shooting and trapping, and secondary poisoning and prey reduction from rodent control programs may be significant factors in the species' decline.

Suitable habitat for the kit fox is limited and fragmented in the project area. Kit foxes may utilize natural habitats in the project area, orchards, or cropland for hunting. Kit foxes are

reported to occur along the Delta-Mendota Canal.

#### *Reasons for Decline*

The San Joaquin kit fox population has declined primarily from habitat loss to agricultural, urban, industrial, and mineral development in the San Joaquin Valley south of Stanislaus County remained untilled or undeveloped (Berry et al. 1987). Deaths caused from collisions with vehicles, illegal shooting and trapping, and secondary poisoning and prey reduction from rodent-control programs may be significant factors in the species' decline. Specific habitat conditions may also render San Joaquin kit foxes more susceptible to predation, thus limiting local populations.

Kit fox mortality results from many sources. Natural sources include predation, starvation, drowning, and disease. Human induced factors include shooting, trapping, poisoning, electrocution, collisions with vehicles, and suffocation (Williams et al. 1998). Loss of habitat from urban, agricultural, and industrial development is the principal factors in the decline of the San Joaquin kit since at least the 1950s (Morrell 1975). The USFWS (1980) estimated that by 1958, 50 percent of the Valley's original natural communities had been converted. The completion of the Central Valley Project and the State Water Project, that diverted and imported new water supplies for agriculture, contributed to an estimated 34 percent loss of natural lands between 1959 and 1969 so that by 1979, only about 7 percent of the San Joaquin Valley floor's original wildlands south of Stanislaus County remained untilled and undeveloped (USFWS 1980, Williams et al. 1989). Subpopulations of the San Joaquin kit fox appear to be increasingly isolated from one another due to other developments within its range including: cities, aqueducts, irrigation canals, surface mining, road networks, petroleum fields, other industrial projects, power lines, and wind farms (Williams et al. 1998). These actions singly and cumulatively compress and constrict the San Joaquin kit fox into fragmented areas, varying in size and quality. The isolation of subpopulations can lead to increased rates of extinction (Gilpin and Sole 1986) due to the effects of inbreeding, genetic drift, Allee effects (Dennis 1989, Fowler and Baker 1991), intra- and interspecific competition, and catastrophic occurrences in the local environment.

Human actions or natural disturbances that contribute to the fragmentation and subsequent isolation of San Joaquin kit fox populations or their habitat have the potential to move the species closer to extinction. Kit foxes have been observed to disperse across disturbed habitats such as agricultural fields, oil fields, rangelands, highways, and aqueducts (Scrivner et al. 1987; see USFWS 1998), but maintaining movement corridors to connect subpopulations remains an important goal of recovery efforts for this species.

Interspecific competition occurs between nonnative red foxes (*Vulpes vulpes*), coyotes, and kit foxes. Nonnative red foxes may invade and occupy historic kit fox habitats, compete for resources, and limit recovery efforts. Coyotes are highly adaptable to disturbed environments and may out-compete kit foxes for available resources as well as kill them opportunistically (White and Garrott 1997, Cypher and Spencer 1998). In some areas predation by large carnivores may account for the majority of the annual adult mortality rate observed among San Joaquin kit fox (Berry et al. 1987). The coyote population on the Naval Petroleum Reserves in California was

reduced in an attempt to enhance the kit fox population, but was ineffective (Cypher and Scrivner 1992).

The recovery strategy for the San Joaquin kit fox operates on two distinct levels; 1) the establishment of a viable complex of kit fox populations (metapopulation) on private and public lands throughout its geographic range and 2) the acquisition of new and better information to aid restoration and management efforts. The metapopulation strategy is dependent on the enhanced protection and management of three geographically distinct core populations: 1) Carrizo Plain Natural Area in San Luis Obispo County; 2) Natural lands of western Kern County inhabited by kit foxes; and 3) the Ciervo-Panoche Natural Area of western Fresno and eastern San Benito counties. These populations are connected to a degree by rangelands with kit foxes occurring at varying densities, providing linkages between the core populations.

The strategy that focuses on new and better information for restoration and management stresses the collection of data on the distribution and status of the fox throughout its range. Other areas of focus include: demographic information for foxes occupying natural, agricultural, residential, and industrial lands; relations between prey populations and kit fox population dynamics; interspecific interactions between kit foxes and other native and nonnative carnivores; and the direct and indirect relations between land use practices and kit fox survival and reproductive success.

#### *Species Occurrence and Habitat Status in the Project Areas*

The San Joaquin kit fox may occur in a variety of habitats in the service area of Santa Clara VWD and in Zone 6 of San Benito CWD including annual grasslands and oak woodland savannahs with more open vegetation, as well as some croplands, orchards and vineyards, and urban areas. Little is known about the status of the San Joaquin kit fox in Santa Clara County and Zone 6 of San Benito County. San Joaquin kit foxes may have always occurred in this area, although likely at low densities. Therefore, the San Joaquin kit fox may occur in low numbers in the action area and could use agricultural lands and more urban areas in addition to natural lands.

#### *Species Occurrence and Habitat Status in the Action Area*

The San Luis Unit lies within the western portion of the historical range of the San Joaquin kit fox (Grinnell et al. 1937). As late as 1919, San Joaquin kit foxes were common on the valley floor of the western San Joaquin Valley (Grinnell et al. 1937). Accounts of trapping on the plains of western Fresno County describe the capture of "100 foxes in one week on an area 20 miles long and 2 miles wide, on the plains on the west side of the San Joaquin Valley, in Fresno County" (Grinnell et al. 1937 in Kelly in press). San Joaquin kit foxes are currently known to occur in the southern part of the San Luis Unit in the City of Coalinga (Brian Cypher Pers. comm.). They have also been captured as recently as 1998 in the northern part of the San Luis Unit near the City of Santa Nella (Uptain et al. 2000). CNDDDB records of sightings for San Joaquin kit fox have been documented within the services areas of the San Luis Water District, Westlands Water District and the Cities of Coalinga and Avenal.

There is one 1993 CNDDDB record of a road-killed kit fox along Highway 99 within the Action Area, and kit foxes have been sighted on a few occasions near the project area in the 1990's (Bell



1994). It is uncertain if they currently occur in the area. The USFWS (1998) documents a few scattered distributional records to the east and north of the City, but most records in Fresno and Madera counties are on the west side of the Valley. Open grasslands and possibly cultivated fields within or adjacent to the Action Area could provide suitable foraging habitat for the kit fox. However, soils in the area may be too clay-rich to provide suitable denning habitat (R. Goss pers. comm. 2004). Within the Action Area, habitat suitability is relatively low due to the predominance of urban landscape and the sparse, fragmented distribution of grassland and open fields. Grasslands and other open areas within the one-mile buffer provide greater habitat potential for this species. These observations suggest that kit fox individuals might occasionally stray into the study area, but are not likely to breed or persist there as long-term residents.

Suitable habitat in the CCWD service area is highly fragmented, but the species has been observed in the CCWD service area. CNDDDB results show 25 known occurrences in the project vicinity, in the following USGS quadrangles: Woodward Island, Clayton, Antioch South, Brentwood, Tassajara, Byron Hot Springs, Diablo, Altamont, and Livermore.

*Species Occurrence and Habitat Status in the CCWD Service Area*

Grasslands (25,479 acres), riparian woodlands (107 acres), and oak woodlands (6,180 acres) in the action area are potentially suitable habitat for the San Joaquin kit fox. The CCWD service area is contiguous with known occupied habitat (CNDDDB 2003). CNDDDB results show 25 sightings in the project vicinity, in the following USGS quadrangles: Woodward Island, Clayton, Antioch South, Brentwood, Tassajara, Byron Hot Springs, Diablo, Altamont, and Livermore. These sightings were recorded in or near Contra Loma Regional Park, Markley Canyon, Byron Hot Springs, Byron, Bethany Reservoir, Lawrence Radiation Laboratory, Brushy Peak, and the Byron Airport (CNDDDB 2003).

In 1993, Service issued a BO (USFWS 1993) to Reclamation on the construction and operating effects of CCWD's Los Vaqueros Reservoir on San Joaquin kit fox in Contra Costa County. Approximately 6,500 acres of these lands are managed as specified management lands for listed species. This includes, but is not limited to, modifying grazing and rodenticide practices to enhance the suitability of grasslands for the San Joaquin kit fox. Although the primary management objective for the entire watershed is to protect water quality, direct and indirect actions to protect water quality will also benefit San Joaquin kit foxes.

All of the contractors that that comprise the Friant Division are within the boundaries of the historical distribution of the San Joaquin kit fox. The conversion of land for agricultural purposes within the contract service area has led to a loss of patches of suitable habitat large enough likely to be inhabited by San Joaquin kit foxes. It is still possible, however, that some San Joaquin kit fox remain in the Friant Division in patches of marginal habitat. This is especially true in the Tulare Irrigation District, Lower Tule Irrigation District, the Southern San Joaquin Municipal Utility District, and the Arvin-Edison Water District. San Joaquin kit foxes have been recorded within or immediately adjacent to these districts within the past ten years (CNDDDB 2000).

The use of highway crossings at a site near Santa Nella, within the DMC Unit project area, were

evaluated by ESRP from 1997 to 2000 (Uptain et al., 2000) and a review and synthesis of existing data on the effects of roads on kit foxes was conducted (Cypher 2000). A long-term study of fox distribution, abundance, movements, and genetics was also conducted in the DMC Unit and surrounding areas for a number of years. The results of that work have not yet been completed or published. Overall findings indicate that San Joaquin kit foxes are extremely rare in the DMC Unit, but that the DMC Unit acts as a genetic corridor between the southern and northern populations of San Joaquin kit foxes.

#### San Joaquin Woolly-Threads

The San Joaquin woolly-threads (*Monolopia* (= *Lembertia*) *congdonii*) was listed as endangered on July 19, 1990 (USFWS 1990). Recovery of San Joaquin woolly-threads is discussed in the Recovery Plan for Upland Species of the San Joaquin Valley (USFWS 1998).

#### *Life History and Habitat Requirements*

The San Joaquin woolly-threads is an annual herb endemic to the southern San Joaquin Valley and surrounding hills. This species, a dicot in the family Asteraceae, is an annual herb endemic to California. It has tiny yellow flower heads clustered at the tips of erect to trailing stems covered with tangled hairs. It is readily distinguished from *Eatonella*, its closest relative, by differences in growth habit, flower and seed morphology, and geographic range. The blooming period extends from March to May.

This annual herb occurs in chenopod scrub, and valley and foothill grassland habitats. The blooming period extends from May to September.

The San Joaquin woolly-threads grows in annual grasslands or saltbush scrub on alluvial fans, often with sandy soil. It occurs on neutral to subalkaline soils deposited in geologic times by flowing water. On the San Joaquin Valley floor, it typically is found on sandy or sandy loam soils, whereas in the Carrizo Plain it occurs on silty soils. San Joaquin woolly-threads occupy microhabitats in nonnative grassland, valley saltbush scrub, interior Coast Range saltbush scrub, and upper Sonoran subshrub communities with less than 10 percent shrub cover but in either sparse or dense herbaceous cover. It has been reported from elevations ranging from 200 to 850 feet on the San Joaquin Valley floor, and from 2,000 to 2,600 feet in San Luis Obispo and Santa Barbara Counties.

The seeds of San Joaquin woolly-threads may germinate as early as November, but usually germinate in December and January. Flowering generally occurs between late February and early April, and may continue into May. Seed production depends on plant size and number of flower heads. In contrast to the more persistent skeletons of Hoover's woolly-star, all trace of San Joaquin woolly-threads plants disappears rapidly after seeds are shed in April or May. Seed dispersal agents are unknown, but may include wind, water and animals. Seed-dormancy mechanisms are thought to allow the formation of a substantial seed bank in the soil.

#### *Historical and Current Distribution*

San Joaquin woolly-threads are endemic to the southern San Joaquin Valley and surrounding hills. Its original range extended from southern Fresno and Tulare Counties (excluding the

Tulare lakebed) to the City of Bakersfield and the Cuyama Valley. San Joaquin wooly-threads currently exist as four metapopulations and several small, isolated populations. The largest metapopulation occurs on the Carrizo Plain, where occupied habitat has been observed to vary from a high of 2,800 acres in a favorable year, to much less in years of lower rainfall. Much smaller metapopulations occur in Kern County near Lost Hills, in the Kettleman Hills of Fresno and Kings Counties, and in the Jacalitos Hills of Fresno County. Isolated occurrences are known from the Panoche Hills in Fresno and San Benito counties, near the City of Bakersfield, and the Cuyama Valley.

The range of this species includes Fresno and Kern counties. Historic records are known from King and Tulare counties, but the plant is believed to be extirpated from these areas (CNPS 1994). Sixty-eight CNDDDB occurrences have been reported within the Fresno, Kings, and Kern counties as of October 2000. The CNDDDB reports that observations occurred between 1893 and 1997, and between the elevations of 190 and 1,700 feet. Eleven of these 68 observations occurred below 1000 feet in quadrangles containing portions of the Friant Division.

#### *Reasons for Decline and Threats to Survival*

Throughout its range, most of its habitat has been eliminated by conversion to agriculture. Threats to remaining unprotected populations include heavy grazing (especially by sheep), oil field development, and possibly air pollution. Population and plant size can vary depending on site and weather conditions. In years of below-average precipitation, few seeds of this species germinate, and those that do typically produce tiny plants.

#### *Species Occurrence and Habitat Status in the Action Area*

Substantial populations are present within the action area (Westlands Water District, City of Avenal, City of Coalinga), in the Kettleman Hills of Kings County and the Jacalitos and Panoche Hills of Fresno County. The Edison quadrangle, which contains portions of the Arvin-Edison Water Service District, has multiple occurrences, as does the Rosedale quadrangle, which contains portions of the Shafter-Wasco Irrigation District. Additional populations are recorded on the Oil Center, Rio Bravo, and Famoso quadrangles, which contain portions of the Arvin-Edison Water Service District, the Schafter-Wasco Irrigation District, and the Southern San Joaquin Municipal Utility District.

Suitable sandy valley and foothill grassland, and chenopod scrub within lakebeds of heavy, saline and/or alkaline clays are present in portions of the Friant Division, particularly towards the southwest San Joaquin Valley. Sensitive habitats (see Habitat Status section below) in which this species occurs includes valley sink scrub, which is an element of chenopod scrub (Holland 1986). Most of this habitat has been extirpated due to flood control, agricultural development, and ground water pumping (Holland 1986).

#### Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) was listed as threatened on August 8, 1980 (USFWS 1980). Critical habitat was designated for the beetle in two areas in Sacramento County on the same date. Recovery of the valley elderberry longhorn beetle is discussed in the Recovery Plan for the valley elderberry longhorn beetle (USFWS

1984).

#### *Life History and Habitat Requirements*

The bodies of valley elderberry longhorn beetles range in size from 13 to 25 mm with males typically being shorter and stouter than females. The beetles have long antenna, often in excess of two-thirds the length of their body.

The valley elderberry longhorn beetle occurs only in the Central Valley in association with blue elderberry. This species is completely dependent on its host plant, elderberry, which is a common component of riparian forests, grasslands, and adjacent foothills of the Central Valley up to 3,000 feet.

Adult beetles feed upon the leaves of elderberry (*Sambucus* spp.) shrubs and lay their eggs within crevices of the bark on the stems of the plant (Arnold et al. 1994). After about ten days, the eggs hatch and the larvae bore into the pitch. The larvae and pupae of the beetle live within the stem of the shrub for up to 2 years before they pupate. Upon pupation, the adults chew through the bark leaving a distinctive exit hole that can be used to confirm the presence of the species without direct observation of individuals.

The beetle prefers to lay eggs in elderberries that are two to eight inches in diameter and shows some preference for stressed elderberries. Adults are present from March through early June with peak activity in May.

Suitable habitat for valley elderberry longhorn beetle consists predominantly of riparian forest with dominant plant species that include cottonwood (*Populus* sp.), sycamore (*Platanus racemosa*), valley oak, and willow (*Salix* sp.), with an understory of elderberry shrubs (USFWS 1991).

#### *Historic and Current Distribution*

The valley elderberry longhorn beetle historically ranged throughout the Central Valley, from Shasta County south into Kern County (Arnold et al. 1994). In contrast, surveys conducted between 1984 and 1991 detected valley elderberry longhorn beetles in only 12 patches of natural riparian vegetation along the Sacramento, American, and San Joaquin Rivers and their tributaries (Arnold et al. 1994). The loss of habitat is the single greatest factor contributing to the decline of this species. Riparian forests throughout the Central Valley have been altered as a result of human activities associated with urban development, agriculture, and water diversions and conveyance.

The range of the valley elderberry longhorn beetle extends throughout California's Central Valley and associated foothills, from about the 3,000-foot-elevation contour on the east and the watershed of the Central Valley on the west (USFWS 1999). Valley elderberry longhorn beetle ranges from the northern end of the Central Valley in Redding, Shasta County, south to the Bakersfield area in Kern County.

Current distribution is patchy throughout the remaining riparian forests of the Central Valley, from Redding, Shasta County, to Bakersfield, Kern County. The beetle's range extends throughout the Valley and surrounding foothills to about the 3,000-foot elevation contour on the east and the watershed of the Central Valley on the west (USFWS 1999).

#### *Reasons for Decline and Threats to Survival*

Extensive destruction of California's Central Valley riparian forests has occurred during the last 150 years due to agricultural and urban development. Frayer et al. (1989) reported that approximately 85 percent of all wetland acreage in the Central Valley was lost before 1939; and that from 1939 to the mid-1980s, the acreage of wetlands dominated by forests and other woody vegetation declined from 65,400 acres to 34,600 acres. The historical loss of riparian habitat in the Central Valley strongly suggests that the range of the valley elderberry longhorn beetle has been reduced and its distribution greatly fragmented. Loss of non-riparian habitat where elderberry occurs (e.g., savanna and grassland next to riparian habitat, oak woodland, mixed chaparral-woodland), and where this species has been recorded (Barr 1991), suggests further reduction of the valley elderberry longhorn beetle's range and increased fragmentation of its upland habitat.

The primary threat to survival of this species, however, continues to be loss and alteration of habitat by agricultural conversion, grazing, levee construction, stream and river channelization, removal of riparian vegetation, rip-rapping of shoreline, as well as recreational, industrial and urban development. Insecticide and herbicide use in agricultural areas and along road right-of-ways may be factors limiting this species' distribution. The age and quality of individual elderberry shrubs/trees and stands as a food plant for this species may also be a factor in its limited distribution.

Population densities of the valley elderberry longhorn beetle are probably naturally low (USFWS 1984); it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991) that this species is a poor disperser. Low density and limited dispersal capability may cause the valley elderberry longhorn beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

Conservation efforts aimed at the species' recovery have included protecting existing elderberry thickets, replanting elderberry shrubs, and transplanting elderberry shrubs inhabited by beetle larvae to new sites. Two sections of the riparian forest community along the American River have been designated as critical habitat for the valley elderberry longhorn beetle.

#### *Species Occurrence and Habitat Status in the Project Areas*

There are two CNDDDB records of this species in the San Joaquin River riparian zone within and immediately adjacent to the Action Area. One record from 1989 is located below the Riverside Golf Course (CDFG 2004). During the February field survey, elderberry plants were observed along the upper river bank adjacent to the golf course and within the flood plain immediately downstream of the Santa Fe Railroad Bridge. Elderberry plants are also known to occur directly upstream of this bridge where installation of the San Joaquin River Parkway trail is proposed, and the USFWS considers valley elderberry longhorn beetle to be present at this site (S. Weaver,

pers. comm. 2004). Another CNDDDB record from 1992 documents valley elderberry longhorn beetle and elderberry plants with exit holes in the Lanes Bridge area along Highway 41, on the northwest side of the San Joaquin River just north of the Action Area (CDFG 2004). This occurrence location partly coincides with the Wildwood Native Park Trail, a California Department of Transportation (Caltrans) habitat enhancement project directly upstream of the new Highway 41 Bridge. Several elderberry plants were observed along this trail during the 2004 field survey. Some of these were planted by Caltrans others were relocated from under the highway bridge in 1997 (T. Marshall, pers. comm. 2004). Caltrans is currently in the seventh year of a ten-year monitoring effort at this site, but has not found evidence of valley elderberry longhorn beetle in the enhancement area. Given the species' preference for mature or decadent elderberry plants, newer plantings may not show signs of the species even if it occurs in the area. Based on existing records and presence of suitable habitat, this species is assumed to be extant in this general area, and is likely to occur in patches of intact riparian forest with elderberry throughout the San Joaquin River flood plain.

The CCWD service area is outside the species' known range and there are no records of this species from the CCWD service area. However, suitable habitat for the species (i.e., elderberry shrubs) has been recorded in the CCWD service area (i.e., north and east of Mount Diablo and east of Pittsburg) and could occur elsewhere along perennial and intermittent streams, levees, stockponds, and foothill seeps.

All of the contractors that comprise the Friant Division are within the boundaries of the historical distribution of the valley elderberry longhorn beetle. There are recent records of their occurrence from the Chowchilla River, the Fresno River, the San Joaquin River, the Tule River, and Deer Creek, all of which flow through contractors in the Friant Division (CNDDDB 2000).

The valley elderberry longhorn beetle is restricted to riparian areas of California's Central Valley (Holyoak 2004). The closest known occurrence record is along Los Banos Creek in Merced County, approximately 12 miles east of the two San Felipe Division service areas, on the eastern side of the Diablo Range (CDFG 2003). This species does not occur within the San Felipe Division service areas and therefore is not discussed in this assessment.

Critical habitat has been designated in two areas in Sacramento County (USFWS 1980). This critical habitat does not occur in the DMC Unit project area. The limited extent of valley riparian habitat identified within the project area indicates a low potential for this species to occur.

Valley elderberry longhorn beetle have been recorded along a riparian area of Los Banos Creek, approximately five miles west of the San Luis Unit, but this area borders the range of *D. c. californicus*, and it may be this subspecies rather than *D. c. dimorphus* (CDFG 2003). There is little riparian forest habitat identified within the San Luis Unit. However, the map sources used may not be of sufficient detail to identify some small areas of riparian habitat that may occur along stream drainages (UCSB 1996, ESRP 2004).

#### Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp (*Branchinecta lynchi*) was listed as threatened on September 19,

1994 (USFWS 1994). Critical habitat was designated for it along with three other vernal pool crustaceans and eleven vernal pool plants in California and Southern Oregon on August 6, 2003 (USFWS 2003). Recovery of the vernal pool fairy shrimp is discussed in the Draft Recovery plan for the Vernal Pools of Northern California which was released in October of 2004.

#### *Life History and Habitat Requirements*

The vernal pool fairy shrimp is a small crustacean in the family Branchinectidae. It is endemic to vernal pools in the Central valley, eastern coastal foothills from Tehama to Riverside counties, and a limited number of sites in the Transverse Range and Santa Rosa Plateau of California (Eng et al. 1990, Sugnet & Associates 1993, USFWS 1994). It ranges in size from 0.4 to 1.0 inches and differs from the Colorado fairy shrimp, which it most resembles, by the antennae and pouch. The basal segment outgrowth below and posterior to the pulvillus is ridge-like on the antennae and the pouch is shorter and broader in the vernal pool fairy shrimp.

Vernal pool fairy shrimp inhabit alkaline pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal pools, vernal swales, and other seasonal wetlands. Occupied habitats range in size from rock outcrop pools as small as one square yard to large vernal pools up to 11 acres; the depth of occupied habitat ranges from 1.2 inches to 48 inches. They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors that include specific salinity, conductivity, dissolved solids, and pH levels. Water chemistry is one of the most important factors in determining the distribution of vernal pool fairy shrimp. The vernal pool fairy shrimp occurs in waters with a pH range of 6.3-8.5 and a temperature range of 4.5-23 C.

This species has been found in two major habitat types. One habitat type is located in the southeast corner of Contra Costa County. The vernal pools located in this area are typically less than three feet in diameter and are characterized by sandstone outcroppings surrounded by foothill grasslands. Vernal pool fairy shrimp are more commonly found inhabiting vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. Vernal pool fairy shrimp reproduce rapidly and develop more quickly than many other Central Valley fairy shrimp. The pools this species dwells in are typically shorter lived than those other Central Valley fairy shrimp inhabit (Eriksen & Belk 1999).

The shrimp swim or glide using 11 pairs of swimming legs that move in a wave-like motion from anterior to posterior (USFWS 1994). In general, these shrimp eat algae, bacteria, protozoa, rotifers, and bits of detritus (Pennak 1989, USFWS 1994). Female fairy shrimp carry eggs in a ventral brood sac. The eggs are either dropped to the bottom or remain in the sac and sink with the female when she dies. The population survives through the dry summer months as diapaused eggs in the pool sediment. Depending upon the species, the resting eggs of fairy shrimp can survive freezing, heat, and prolonged desiccation. Some of these eggs will hatch when the pool fills with water in subsequent seasons, while the remaining eggs remain in the sediment. Eggs contained within the sediment at any given point can represent eggs deposited from several breeding seasons. The early stages of fairy shrimp rapidly develop into adults whose populations

disappear long before the vernal pools dry up. This life history contributed to the basis for a standard survey protocol developed by the USFWS to determine the presence or absence of the vernal pool fairy shrimp.

The vernal pool fairy shrimp matures rapidly which allows it to persist in pools that are filled for only a short period, but it can persist into the spring when and where pools persist longer. The active period for this species of shrimp has been observed to extend from early December to early May (USFWS 1994). For the same reason as the longhorn fairy shrimp, the distribution and abundance of the vernal pool fairy shrimp should be based on the distribution and number of occupied vernal pool complexes throughout the species' range.

This species has a sporadic distribution within vernal pool complexes wherein the majority of pools in a given complex are not inhabited by the species. Only rarely does the vernal pool fairy shrimp co-occur with other fairy shrimp species, but where it does, the vernal pool fairy shrimp is never the numerically dominant one. The vernal pool fairy shrimp has been collected from early December to early May.

Vernal pool fairy shrimp have been found in vernal pools with the following anostracans: California linderiella fairy shrimp (*Linderiella occidentalis*), conservancy fairy shrimp (*Branchinecta conservatio*) (vernal pool fairy shrimp were found occurring with *B. conservatio* in Merced Co. only), mid-Valley fairy shrimp (*Branchinecta mesovallensis*), alkali fairy shrimp (*Branchinecta mackini*) versatile fairy shrimp (*Branchinecta lindahli*) and longhorn fairy shrimp (*Branchinecta longiantenna*). Vernal pool fairy shrimp cysts have been found to co-occur with Riverside fairy shrimp (*Streptocephalus woottoni*) cysts, although the two species have not been observed swimming together at maturity (Eriksen & Belk 1999; M. Belk 2004, pers. comm.).

#### *Historic and Current Distribution*

Vernal pools, swales, and ephemeral freshwater habitats comprise the primary habitat types. The range includes disjunct occurrences in the Central Valley, from Shasta County to Tulare County, and in the central and southern Coast Ranges, from northern Solano County to Ventura County. Additional occurrences have been identified in southern California and in Oregon.

There are 32 known populations of the vernal pool fairy shrimp, extending from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County (50 CRF Part 17). Four additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one on the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County.

While this species has a wide distribution throughout the state it is not seen in abundance at any one location. Because it typically occurs in such low abundance, its presence may be overlooked (Eriksen & Belk 1999).

#### *Reasons for Decline and Threats to Survival*



The vernal pool fairy shrimp is in danger of extinction for the same reasons as the longhorn fairy shrimp; flood control, highway, and utility projects, urban development, conversion of native habitats to agriculture, and stochastic events (USFWS 1994).

The loss of vernal wetlands is the primary cause for the decline of the vernal pool fairy shrimp. The Service estimated that 90 percent of the suitable habitat for these species has been destroyed by human activities (e.g., commercial and residential development, agricultural development, off-road vehicle use, water development projects, and flood control projects). Habitat has been lost not only from direct destruction and modification of vernal pools, but also from alterations in vernal pool watersheds caused by modification of surrounding uplands. (USFWS 1994.)

The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem that has been converted to mainly agricultural and urban uses.

A large percentage of the habitat that once supported vernal pools has been destroyed. Since 1973, a substantial amount of vernal pool habitat has been converted for human uses. This highly disturbed remnant habitat is imperiled by a variety of human-caused activities, primarily urban development, water supply and flood control projects, and agriculture. Rapid urbanization of the Central Valley of California currently poses the most severe threat to the continued existence of the listed vernal pool fairy shrimp. The habitat of the vernal pool fairy shrimp is highly fragmented. This fragmentation results in small isolated populations which may be susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance. Urban development, water supply and flood control projects, and agriculture also threaten this highly disturbed remnant habitat.

#### *Species Occurrence and Habitat Status in the Project Areas*

It is unknown whether any vernal pools remain in Santa Clara County and there are no records of the vernal pool fairy shrimp for the county. The vernal pool fairy shrimp has been recorded in San Benito County and potentially occurs in Zone 6. However, little is known about the distribution of vernal pools in Zone 6 and whether they are occupied by the vernal pool fairy shrimp.

There is suitable habitat in the DMC Unit project area; however, this species has not been documented. There are no known occurrences of vernal pool fairy shrimp within the San Luis Unit. The closest known occurrence records are northeast of the San Luis Unit in the San Luis National Wildlife Refuge complex (CDFG 2003). Vernal pool fairy shrimp are known from many of the quadrangle areas that contain the Friant Division. There are no other areas of critical habitat near or in San Luis Unit. There are nine recorded observations of this species in the Action Area, one of which occurs in the CCWD service area.

#### *Critical Habitat*

Critical habitat for vernal pool fairy shrimp is located adjacent to, but not within, the Action Area. Critical habitat unit 24A (Fresno Unit, Fresno County) (USFWS 2003) is located south of Millerton Lake, and contains a portion of the Friant-Kern Canal. This critical habitat unit is

characterized by hardpan vernal pool complexes on alluvial fans and terraces (USFWS 2003).

#### Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardii*) was listed as endangered on September 19, 1994 (USFWS 1994). Critical habitat was designated for it along with three other vernal pool crustaceans and eleven vernal pool plants in California and Southern Oregon on August 6, 2003 (USFWS 2003). Recovery of the vernal pool tadpole shrimp is discussed in the Draft Recovery plan for the Vernal Pools of Northern California which was issued in October of 2004.

#### *Life History and Habitat Requirements*

Vernal pool tadpole shrimp are a member of the aquatic crustacean order Notostraca. Adults possess 35 pairs of legs and two long cercopods, and may reach a length of two inches.

Vernal pool tadpole shrimp are restricted to vernal pool/swales and ephemeral freshwater areas. The life history of the vernal pool tadpole shrimp is linked to the phenology of the vernal pool habitat. The vernal pools have a very low conductivity, total dissolved solids, and alkalinity. These pools are located most commonly in grass-bottomed swales of grasslands in old alluvial soils underlain by hardpan or in mud-bottomed pools containing highly turbid water. It has also been observed in stock ponds and other seasonal wetlands.

After winter rainwater fills the pools, the populations are reestablished from diapaused eggs that lie dormant in the dry pool sediments. The vernal pool tadpole shrimp matures slowly and is long lived so the adults are often present and reproductive until the pools dry up in spring. The vernal pool tadpole shrimp often occurs with the vernal pool fairy shrimp (USFWS 2003).

Unlike fairy shrimp, vernal pool tadpole shrimp swim with their legs down, climb on objects, and plow through sediments on the pool bottom (USFWS 1994). Their omnivorous diet contributes to the importance of their ecological role within vernal pool communities. Vernal pool tadpole shrimp consume detritus, earthworms, mollusks, dead tadpoles, frog eggs, fairy shrimp, and a variety of other invertebrates and microorganisms (Pennak 1989, USFWS 1994).

Female tadpole shrimp produce up to six clutches of eggs per season, yielding more than 800 eggs in all, which are deposited on vegetation at the bottom of the pool. A portion of the eggs will hatch immediately while the rest enter diapause (dormancy). Adults remain present and reproductively active until the pools evaporate. Like fairy shrimp, the population survives through the dry summer months as diapaused eggs in the pool sediment. Some of these eggs will hatch when the pool fills with water in subsequent seasons, while the remaining eggs remain in the sediment (USFWS 1994). Eggs contained within the sediment at any given point can represent eggs deposited from several breeding seasons. Vernal pool tadpole shrimp reach maturity 3 to 4 weeks after initial inundation of the vernal pool. Service has developed standard survey protocols for wet and dry seasons to determine the presence or absence of this species in vernal pool habitats.

The vernal pool tadpole shrimp's diet, dispersal mechanisms, and ability to with stand disturbance are believed to be similar to those of the longhorn and vernal pool fairy shrimp. No

recovery plan has been developed for this species, nor has critical habitat been designated. The conservation efforts for this species are the same as those previously discussed for the longhorn and vernal pool fairy shrimp.

#### *Historic and Current Distribution*

The species is endemic to vernal pools throughout the Central Valley and is found in suitable habitats in the Central Valley from Shasta County to northern Tulare County, and in the central coast range from Solano County to Alameda County. The species inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. The vernal pool tadpole shrimp is known from 18 populations in the Central Valley, ranging from east of Redding in Shasta County south through the Central Valley to the San Luis National Wildlife Refuge in Merced County and from a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County (50 CFR Part 17). The vernal pool tadpole shrimp inhabits vernal pools that contain clear to highly turbid water and range in size from 6 square yards in the Mather Air Force Base area of Sacramento County to the 89-acre Olcott Lake at Jepson Prairie.

Although the species is endemic to vernal pools throughout the Central Valley, their current distribution is restricted to vernal pool habitats in 18 populations within the valley. These populations occur in the north, east of Shasta County south to the San Luis National Wildlife Refuge in Merced County, and from a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in Alameda County (USFWS 1994). Like the other vernal pool branchiopods discussed, the abundance and distribution of vernal pool tadpole shrimp should be based on the distribution and number of occupied vernal pool complexes throughout the species' range and not individual vernal pools.

#### *Reasons for Decline and Threats to Survival*

The loss of vernal wetlands is the primary cause for the decline of the vernal pool tadpole shrimp. Service estimated that 90 percent of the suitable habitat for these species has been destroyed by human activities (e.g., commercial and residential development, agricultural development, off-road vehicle use, water development projects, and flood control projects). Habitat has been lost not only from direct destruction and modification of vernal pools, but also from alterations in vernal pool watersheds caused by modification of surrounding uplands (USFWS 1994). The vernal pool tadpole shrimp was listed as Endangered by Service in 1994 largely because of the significant threats associated with future habitat loss and fragmentation (USFWS 1994).

#### *Species Occurrence and Habitat Status in the Project Areas*

Critical habitat for this species was designated on August 6, 2003 (USFWS 2003), but the CCWD service area falls outside of designated critical habitat. There are no recorded observations of this shrimp species in the CCWD service area, but there is one recorded observation just north of the CCWD service area, in Montezuma (CNDDDB 2003).

Vernal pool tadpole shrimp are known from many of the quadrangle areas that contain the Friant Division.

There is suitable habitat in the DMC Unit project area; however, this species has not been documented in the service area.

The final designation of critical habitat for four vernal pool crustaceans, including the vernal pool tadpole shrimp, was published on August 6, 2003. There are no other areas of critical habitat near or in the San Luis Unit. There are no known occurrences of vernal pool tadpole shrimp within the San Luis Unit. The closest known occurrence record is from 2003 and approximately five miles northeast of the San Luis Unit near Henry Miller Road and State Route 165, north of Los Banos (CDFG 2003).

As of 1999 there were no known occurrences of vernal pool tadpole shrimp in Santa Clara County, but they could possibly be found in Santa Clara County (Mary Belk, pers. comm.). There are occurrence records of and critical habitat for vernal pool tadpole shrimp in a vernal pool complex approximately two miles north of the Santa Clara VWD service area on or near Don Edwards San Francisco Bay National Wildlife Refuge (CDFG 2003). In an article originally published by the San Francisco Bay Bird Observatory, Valerie L. Layne lists two locations of vernal pools in the South Bay area. The first is the area of Don Edwards San Francisco Bay National Wildlife Refuge north of the action area. The second is a location near Alviso (Layne 2004) near Disk Drive and Nortech Parkway. The Alviso site was privately owned and developed as a religious center and parking lot in 1997 (SCVAS 2004). This species is not considered to occur within the San Felipe Division service area.

### **Effects of the Proposed Action**

This biological and conference opinion does not rely on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to critical habitat.

The “effects of the action” is defined in the Service regulations (50 CFR 402.02) as:

*The direct and indirect effects of an action on the species or critical habitat, together with the effects or other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline.*

A list of species for counties occurring in the Action Area for the O&M project was developed on April 1, 2004. This list was screened against baseline information on species potentially occurring in project areas developed for LTRC Biological Assessments. Information from BA's covering the Contra Costa Canal (including Contra Costa Water District), the San Felipe Project (including San Benito County Water District and Santa Clara Valley Water District), the Delta Mendota Canal, and the San Luis Unit - San Luis Project (including California Department of Fish and Game, California

Department of Water Resources, Westlands Water District) was used to identify species which would not be expected to occur in the project area. Additionally, information from the updated Reclamation 2001 Friant BA was used as the screen for the FKC and Madera Canal O&M project facilities. The Columbia-Mowry facilities, which are part of the Friant Project, are adjacent to and entirely within about 2 miles of the San Luis Unit Project area. Consequently, species from the DMC, Friant, and San Luis Unit BA's that extend 2.5 miles from these projects were used to screen species for this area. Following the species name is the list of Authorities who operate or maintain lands or facilities on which this species might be found.

Baseline information from the BA's described above is provided for each species that may occur in the project area. The Baseline includes information on species life history, habitat requirements, historic and current distributions, reasons for decline and threats to survival, and species occurrence and habitat status in the Service Areas, which includes areas adjacent to project facilities and lands.

Operations and maintenance activities applied to lands and facilities are varied and the potential for these actions to result in take of listed species is not easily predicted or quantified. Direct effects from O&M project actions depend on the spatio-temporal overlap of a species and the conduct of an action. Indirect effects result from actions, but are removed in time. Much of the project area is disturbed landscape located within highly disturbed agricultural or urbanized landscapes. Listed plant species are generally not found in the project area because they are intolerant of the types of disturbance associated with agriculture, were removed during urbanization of the area, or they were removed during project development. In contrast, some listed animal species are broadly distributed and can utilize disturbed habitats or those habitats found in the project facilities such as ditches, canals, barren areas, embankments, and so forth. Additionally, the linear project facilities which traverse agricultural and urbanized habitats can provide travel corridors, although with some risks. Actions that disturb soil or accumulated silt or soil material in drains, those which destroy niches, and those which reduce vegetation likely have the most significant impacts to listed species.

During the consultation process Reclamation and Service generated an "effects table" (Table 2 - Routine O&M Activities on Terrestrial SCCAO Facilities – 2004 Programmatic O&M Consultation), which describes each of the 59 routine activities in detail, the species that could potentially be affected by those actions, the screening process used to determine the effects, conservation/avoidance measures Reclamation has placed in the project description to reduce the effects, and the effects determination.

Indirect effects are defined in Service's regulations (50 CFR 402.02) as: *those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.* Cumulative effects are described in the same regulations as: *effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.*

San Joaquin kit fox could be affected by the use of rodenticides. Although protective measures are taken on Reclamation-owned lands, spillage of bait can occur and adherence to label instructions would not necessarily guarantee that one of the above species would not be adversely affected. Pelleted products with attractants such as fish oil are available and used within the range of kit foxes and kangaroo rats. Some pelleted baits are approved for broadcast use, which is to scatter the bait upon the ground. Foxes feed upon seeds and small items such as beetles, which are similar in size to some of the pelleted rodenticides. Although zinc phosphide baits will be regurgitated by a fox, anti-coagulant baits such as diphacinone and chlorophacinone are routinely used and could be harmful to kit foxes. Secondary poisoning may occur with some types of bait. Any type of rodent poison would be harmful to kangaroo rats. Rodenticide use in the heavily agricultural San Joaquin Valley is a complex issue, and changes to regulations which could be helpful are outside of Reclamation's legal authorities.

The presence of vegetation deters erosion and also can discourage burrowing activity by rodents, although some vegetation types provide habitat for burrowing rodents. Planting vegetation may therefore reduce the need to fill earthen holes in embankments. In some locations on project lands, however, the presence of vegetation precludes visual monitoring of the condition of the facilities. Where safety and structural concerns exist, vegetation must be removed or controlled. Coordinated efforts must therefore be undertaken to identify vegetation to be maintained or encouraged and where it must be controlled. These concepts are being applied in the management of rights-of-way, in part as a result of economic incentives to minimize costs of management input.

Threatened and endangered plants, like all plants, are associated with specific soil types, and are sessile in nature. Some species thrive in disturbed soils, while others do not. Although the Madera Canal and Friant Kern Canal, as well as other canals are located in areas with a number of threatened and endangered plant occurrences within the buffer zone, the rights-of-way have been severely disturbed during construction of the canals. Reclamation has had biological surveys conducted a number of times over the years along the FKC and MC, and no threatened or endangered plants have been found. Surveys of plants began in 1990 and were conducted again in 1993 as well as subsequent years. Additional surveys were conducted when projects adjacent to locations where CNDDDB occurrences had been reported. Surveys have not been as extensive along other canals, but high levels of disturbance suggest that it is unlikely for native plants to exist at these sites.

*Blunt-nosed Leopard Lizard (CDWR, FWUA, SBCWD, SCVWD, SLDMWA, WWD)*

*Actions from Table 1:*

- Blading & disking rights-of-way
- Blading of O&M roads
- Contact herbicide application
- Pre-emergent pesticide application
- Mowing rights-of-way
- Squirrel baiting
- Embankment maintenance

Adult blunt-nosed leopard lizards (BNLL) are active above ground from about March or April through July. Beginning in August or September, adults are no longer active above ground. Hatchlings, however, remain active above ground until October or November, depending on weather. This species is most likely to be seen in the morning or late afternoon, when air temperatures are between 74 and 104 F°. They are known to seek shelter in the burrows of animals such as the California ground squirrel. Although found scattered on the San Joaquin Valley floor, recent surveys showed that it is not widespread near project areas. They occupy annual grassland, alkali playa, valley saltbush scrub habitat. Suitable habitat is available on project areas along the San Luis Canal and at Little Panoche WA and perhaps near Coalinga Canal. Although species occurrences are found along the Friant-Kern Canal, habitat does not exist on the rights-of-way and very little remains adjacent to the canal. It is highly unlikely that the blunt-nosed leopard lizard would be found on the Friant-Kern Canal.

This species has been found along San Luis Canal near Arroyo Pasajero and may be affected by weed removal and erosion control along levees of the San Luis Canal and Coalinga Canal. Routine filling of holes, erosion sites and ground squirrel burrows, as well as control of ground squirrel populations would remove BNLL habitat and could crush individuals. Mowing, blading, and disking of rights-of-way could provide favorable open habitats, at the cost of some mortality. Herbicide applications may indirectly affect BNLL by providing more favorable open habitats, although reduced vegetation could reduce arthropod prey abundance. The species may also be affected by the toxicity of the chemicals.

*California Red-legged Frog (CCWD, CDFG, FWUA, SBCWD, SCVWD, SLDMWA, WWD)*

*Actions from Table 1:*

- Aquatic weed contact herbicide application
- Blading and disking of rights-of-way
- Liner repair
- Contact herbicide application
- Drain ditch and channel maintenance
- Mudjacking and grout injection
- Pre-emergent herbicide application
- Squirrel baiting
- Embankment maintenance

This species is endemic to California and Baja California, Mexico from near sea level to 1500 m. The species uses a variety of aquatic, riparian and upland habitats, but spends considerable time resting and feeding in riparian vegetation when it is present. They prefer permanent water with emergent or dense riparian vegetation. Breeding occurs from November through April and individuals may disperse during breeding season. Likely extirpated from the Central Valley floor, surveys in drainages at valley elevations on the west side of the San Joaquin Valley along the San Luis Canal have not found this species. Consequently, actions would not affect this species in most project areas.

Red-legged frogs inhabit project areas in Contra Costa Water District, Santa Clara Valley Water District and San Benito County Water District. They are likely not found in the Central Valley or Sierras in the project area. Three frogs were found during replacement of a culvert for the Multi-Purpose Pipeline project which utilizes the right of way of the CCC. Additionally, a pond near the San Justo Reservoir has harbored a population of frogs for several years. The Endangered Species Recovery Program (ESRP) conducts monthly site visits and bi-annual surveys of this pond, and is developing an outline for management of this population. Sixty California red-legged frogs were detected in this pond in October of 2003 (Newman et al. 2003). A consultation covering O&M for facilities that support this pond and the frog population has been completed with the Ventura Field Office of the Fish & Wildlife Service; the project itself, however, has been cancelled by Reclamation because of contractual issues.

Red-legged frogs can occur in the Mt. Diablo Range along the Pacheco Conduit and along the Santa Clara Tunnel and Conduit. Frogs may also inhabit areas around Contra Loma Reservoir in CCWD. Pesticide applications that are made around inspection vaults and along roadways of the conduits, and near pumping plants in the San Felipe project and at Contra Loma Reservoir, may affect the frogs. Although the area to which pesticides are applied is relatively small, it is likely that in the spring when frogs move overland for distances up to, or greater than one mile, they would encounter areas along the rights of way that had been sprayed. Additionally, it is likely that small amounts of pesticides or adjuvants (pharmacological or immunological agents added to pesticides and herbicides to increase the chemical's effects) will enter waterways from runoff. This material could harm frogs, but specific effects of the most commonly used materials on red-legged or other frogs are not adequately known. Some herbicides are known to cause developmental abnormalities (Hayes et al. 2002). Additionally, red-legged frogs could be directly impacted by vehicle strikes from mowers, graders, or spray rigs etc. traveling rights-of-way along the Pacheco Tunnel and Conduit, the Santa Clara Tunnel and Conduit, at San Justo Dam and Reservoir, and Contra Loma Reservoir. Rodents are controlled at the Dam and Dike at San Justo Reservoir and around Contra Loma Dam. This action may reduce burrow availability for red-legged frogs found in that area.

An observation of red-legged frogs was recently made at Little Panoche Detention Dam. It is unlikely that many frogs occur below this elevation and would inhabit the project area. Additionally, red-legged frogs are unlikely to inhabit the DMC or SLC. However, with significant flooding of drainages that cross these canals (e.g. Orestimba creek and Little Panoche creek) some individuals could be washed downstream and could populate lower ends of watersheds crossing these facilities. Frogs inhabiting drains would be subject to drain cleaning operations along these canals, and maintenance and cleaning of drain ditches and channels could directly take individuals, as well as reduce the available habitat.

*Proposed Critical Habitat for the California Red-legged Frog (HC, PC, SCT)*

*Actions from Table 1:*

- Excavation for conduit/tunnel repair
- Contact herbicide application
- Pre-emergent herbicide application



- Embankment maintenance
- Utility trenching

None of the O&M activities described below will affect essential aquatic habitat or associated upland habitat because the CVP facilities in Unit 15 are not associated with permanent aquatic or riparian features, or are within 300 feet of aquatic habitat. The effects of these activities, if any, are primarily to dispersal habitat. None of the habitat that may be associated with these facilities represents habitat that has significant conservation value for the red-legged frog. Except for contact herbicide application, the habitat disturbance associated with most of these activities occurs infrequently.

For conduit and tunnel repair, only minor patches are made after excavation at sites displaying seepage. Full dewatering of tunnels/conduits/pipelines in the San Felipe Project is considered major non-routine maintenance and is reviewed for environmental effects in separate environmental documents. Space between soil and cracked panels which may be exploited by frogs may be destroyed by heavy equipment used to remove panels and compact soil, or labor to build forms.

Application of herbicides would reduce, modify, or eliminate vegetation from treated areas. Since these facilities are not associated with essential aquatic or riparian habitat, this activity is unlikely to measurably affect primary constituent elements.

Backhoes, graders, excavators or hand implements are employed to fill gullies, burrows, compact soil and grade slopes as needed, but primarily during the dry season. Trucks are used to haul fill. This action disturbs soil and may damage or destroy burrows.

Work is done with a trencher, backhoe or excavator to lay underground utilities to facilities and upgrade the systems in place. Most utility infrastructure has been provided and the need for trenching is infrequent. Trenching disturbs soil and may damage or destroy burrows inhabited by listed species or used by their prey.

*California Tiger Salamander (CCWD, FWUA, MCWPA, SBCWD, SCVWD, SLDMWA, USBR)*

*Actions from Table 1:*

- Aquatic weed contact herbicide application
- Blading and disking of rights-of-way
- Liner repair
- Contact herbicide application
- Drain ditch and channel maintenance
- Mudjacking and grout injection
- Pre-emergent herbicide application
- Squirrel baiting
- Embankment maintenance

California tiger salamanders are found in grassland and mixed grassland and foothill woodland habitat below 1500 feet in elevation. They use upland habitats during the non-breeding season, inhabiting cracks, fissures, rodent burrows and other moist places in soil. As adults, individuals become active in late winter to early spring and move overland to breeding sites. Breeding sites historically included vernal pools and streams, and now include these habitats as well as stock ponds that lack predatory fish. Regulating reservoirs and seeps along canals that contain water provide habitat for salamanders.

The type specimen for the California tiger salamander is from the area near the town of Friant, California. Reclamation has been conducting surveys for this species along the rights-of-way since the 1980's. They may be found anywhere along the Madera Canal and on the Friant-Kern Canal from Friant Dam to Woodlake, California. Surveys in pools and puddles along the FKC and MC that were recently concluded found larvae in both locations. Locations of the pools were entered into GPS units and will be included as a layer on future GIS maps. The information is not yet available but will be provided to the Service when it is available. The grasslands along the entire length of the Madera Canal provide suitable habitat, and the Madera Equalizing Reservoir likely provides some of the best project habitat because of the presence of vernal pools.

Tiger salamanders are also found in the SCVWD and SBCWD project areas, which have significant expanses of grassland and foothill woodland habitat associated with them. They also may be found in project areas along the CCWD. The salamanders are likely found along the rights-of-way for project areas in the SCVWD that traverse the coast foothills and near Lake San Felipe. While heavily urbanized, remnant populations may still persist along the Contra Costa Canal, especially near Contra Loma Dam and Reservoir, where upland habitat still exists.

Spraying of herbicides could adversely affect salamanders because they may absorb toxic chemicals through their skin. Use of exploder devices and gas cartridges would kill salamanders. The species could also be adversely affected by activities such as mudjacking or pressure grouting, and could fall into recorder wells where they could become trapped.

Mudjacking and pressure grouting (injection of a cement, bentonite clay, and water mixture) along canal liners to fill voids, repair of liner cracks with concrete, and filling or compressing earthen holes, erosion sites or rodent burrows in canal banks, levees and around structures could bury or crush California tiger salamanders. Drains, culverts and underground pipes that contain moisture are likely attractive and salamanders inhabiting them could be harmed when these structures are cleaned. Canal dewatering usually occurs during winter and this action may make small pools in canals available to tiger salamanders when they are active above ground. These sites would be attractive to tiger salamanders, but also invite predators. Upon re-flooding, California tiger salamanders in dewatered canals or other water conveyance structures could be transported to unfavorable habitats or locations, including through powerplant turbines (i.e. on the Madera Canal) through siphons and into turnouts. Wells and cattle guard crossings which lack exit ports are potential traps for the species. Additionally, pesticide and adjuvant residues on rights-of-ways which the salamanders would cross could be directly harmful to the species. Control of burrowing rodents indirectly affects the species by reducing burrow habitat used for

resting and as hibernacula. They could also be adversely affected by earthmoving activities such as grading, blading, backfilling, and filling of rodent burrows.

Cracks along lined canals are repaired as found. These cracks could harbor California tiger salamanders that would be encased when repaired. More extensive liner repair on the Contra Costa Canal is being covered under separate environmental review. Mudjacking to fill voids is conducted as needed on the FKC and the MC. On the Madera Canal, approximately 20 cubic yards of concrete slurry is pumped annually to fill about 10 voids. Along the FKC, approximately 10 cubic yards is pumped in the lower  $\frac{1}{3}$  reach of the canal, where fewer California tiger salamanders would be expected. In the upper two sections, approximately 3 cubic yards are used for each section. Although unlikely to be sprayed directly with an herbicide, California tiger salamanders that are dispersing in SCVWD project areas would likely contact herbicides applied to rights of way which pass through suitable habitat. Additionally, indirect effects in these four locations would occur from control of rodents at all locations. Rodent control would reduce the number of burrows available to the species. Rodents are controlled at the Dam and Dike of San Justo Reservoir and California tiger salamanders are recorded in the vicinity of these sites.

*Proposed Critical Habitat for the California Tiger Salamander (FKC, HC, MC, SJD)*  
*Actions from Table 1:*

- Squirrel baiting
- Road blading
- Canal dewatering and desilting
- Ditch and channel maintenance
- Pre-emergent herbicide application
- Contact herbicide application
- Drainage improvements
- Embankment maintenance
- Canal linear extension
- Road construction/rehabilitation

It is unlikely that the O&M activities described here will adversely affect natural or man-made aquatic habitat of California tiger salamander. Vernal pools are not associated with these facilities, and we do not consider ephemeral wetlands in temporarily dewatered canals to constitute a primary constituent element. These features have no long term conservation value for salamander, and function more as an attractive nuisance. O&M activities may affect primary constituent element (PCE) 2 and PCE 3 primarily by either reducing populations of animals that may provide burrows for salamanders, and by directly destroying burrows associated with breeding pools and upland dispersal habitat. None of the habitat features associated with these facilities is of significant conservation value to the California tiger salamander.

The O&M activities at San Justo Dam that are not being addressed in a separate consultation with the Ventura Field Office are analyzed in this biological and conference opinion.

A grader or tractor with mounted blade is used to scrape unpaved roadways and road shoulders to remove weedy vegetation, ruts, and to level and maintain the surface for access to the project. Blading O&M non-paved roads is conducted along approximately 150 miles of roadway along the FK-Canal annually and on 36 miles of roadway along the Madera Canal annually. Blading occurs during the dry season, primarily from May through November. Machinery disturbs soil on the roadway and on the shoulders. Vegetation providing food and/or cover for listed species or habitat for prey is removed. Burrows on road shoulders are damaged or destroyed. Many other activities may result in localized loss of burrows, including installation of fences, guardrails and signs; repair of electrical lines, utilities and signs; embankment maintenance; beach belting; canal linear extension; canal desilting; and minor road construction/rehabilitation. Potential burrow habitat may be indirectly reduced by control of squirrel populations.

Application of herbicides would reduce, modify, or eliminate vegetation from treated areas. As practiced, it is unlikely to measurably affect primary constituent elements.

Dewatered FK-Canal and Madera Canal may provide habitat attractive to California tiger salamander, which when reflooded, traps salamanders or displaces them from areas with suitable habitat. The removal of vegetation from ditches removes habitat that may be used seasonally by California tiger salamander along the FK-Canal and Madera Canal.

Heavy equipment, including dozers, tractors, backhoes, longsticks, and graders etc. are used to excavate drainage trenches and install drain pipe or to fill low spots to improve drainage. Additionally, trenches and drains are cleared of vegetation and silt with heavy equipment or by hand. Excavated material is piled on levees or rights of way, or is transported by truck to an offsite location. Drainage improvements are made as needed, although mostly annually, along the FK-Canal and Madera Canal. Work occurs preferentially during dry conditions, usually in the fall, before rains begin. Soil is disturbed and depressions that collect water are filled, reducing potential ephemeral habitat for California tiger salamander.

*Giant Garter Snake (CCWD, CCRD, CDFG, FWUA, SLDMWA)*

*Actions from Table 1:*

- Blading and disking of rights-of-way
- Blading of O&M roads
- Liner repair
- Contact herbicide application
- Drain ditch and channel maintenance
- Mudjacking and grout injection
- Pre-emergent herbicide application
- Mowing rights-of-way
- Squirrel baiting

This species utilizes freshwater wetlands throughout the Central Valley. Service currently recognizes 13 populations of the snake as far south as Bakersfield. The area around the eastern end of Contra Costa Canal is not as urbanized and could provide suitable habitat, with emergent

vegetation (*Scirpus* sp.) and permanent water, although few snakes have been observed in surveys in CCWD, and none recently. Extant populations of the giant garter snake are known to occur in Mendota Pool and on the Volta Wasteway Wildlife Area, in SCCAO. Mendota Pool is not part of the project area, although the delivery channel to the Columbia – Main Pumping plant is connected to Mendota Pool, as is the DMC, and snakes in the Pool could use these project areas. The San Luis Drain also may provide some habitat. Giant garter snakes have been recorded on the Volta Wasteway, which passes through the Wildlife Area and east of the project in the vicinity of the San Luis National Wildlife Refuge. Cleaning radial gates and changing their settings on the Wasteway on Volta Wildlife Area could disturb snakes and affect their food supplies.

Permanent water with emergent vegetation is preferred habitat of the snake. Cover is lacking in the DMC in the vicinity of Mendota Pool, in the San Luis Drain and also in the delivery channel to the Columbia-Mowry Pump, although open canals and channels may be used by the species. The drawdown of the DMC to facilitate inspection of the Mendota Pool Dam is done in late November through January, after giant garter snakes would enter hibernacula; reflooding occurs prior to giant garter snake emergence in spring. This project action would not likely affect the species or its habitat. Clearing channels of siltation with equipment at CCRD is done early in winter after snakes become inactive. However, soil that is piled next to the channel could bury snakes that are in crevices or are in hibernacula. Grading of banks and application of pesticides to rights of way could be harmful to snakes in upland sites. Herbicides are applied to ditches at Volta Wasteway Wildlife Area. Herbicides also are applied to CCRD project areas, to the DMC and the portion of the San Luis Drain extending from about the town of Mendota to Mud Slough. Snakes contacting these areas could contact toxins and runoff may affect the food base. Control of rodents along the DMC and near the pumping facilities would reduce potential den sites.

Pump operation may be a hazard to the snake. Giant garter snake records in Mendota Pool are located away from the Columbia-Mowry Pumping Plant, in the main pool during summer, but precise locations of where snakes travel to overwinter, and whether this movement occurs during pumping operations is unknown. Additionally, giant garter snakes in CCWD were located on the east end of the district. The CCC could provide a travelway and snakes reaching pumping plant 1 could be harmed if taken into the pump. Unknown are the effects, if any, of water discharged from the "DMC Sumps" into the DMC and subsequently into Mendota Pool.

Repair and maintenance of the channels, ditches, canals, roads, and rights-of-way may affect the species by equipment-caused mortality, by reducing the available habitat, or by closing (burying) hibernacula and burrows used as refuges. Control of ground squirrels will also reduce the amount of refuge habitat available.

*San Joaquin Kit Fox (CCWD, CCRD, CDFG, CDWR, FWUA, MCPWA, SBCWD, SCVWD, SLDMWA, USBR, WWD)*

*Actions from Table 1:*

- Blading and disking of rights-of-way
- Blading of O&M roads

- Contact herbicide application
- Pre-emergent herbicide application
- Squirrel baiting
- Embankment maintenance

This species occurs widely and could be found in most of the project area, including lands operated and maintained by all authorities conducting O&M in the SCCAO. A few areas are known for significant populations of San Joaquin kit fox. Populations are known to exist in the vicinity of Santa Nella, near San Luis Reservoir and the confluence of the California Aqueduct and the Delta Mendota Canal at O'Neill Forebay maintains, as well as in places along the FKC from Woodlake to Bakersfield. Surveys have been conducted sporadically beginning in 1993 along the Madera Canal and from Friant Dam to Woodlake. No evidence of kit foxes in those areas has ever been observed. Camera station surveys conducted by the California Department of Water Resources in the vicinity of Arroyo Pasajero Detention Reservoir along the San Luis Canal in 2002 failed to detect kit foxes and spotlight surveys in 2003 also failed to positively identify kit fox at this site.

Although the population along the DMC is relatively small, the population near Santa Nella exists in a corridor that likely genetically links populations of foxes from the inland valley with those distributed in western and northern populations of the range. This corridor extends through the Pacheco Pass and surrounding hills. In contrast, the population on the lower FKC is distinct, but may have ties to populations further south in Bakersfield. Land use in the Santa Nella area is undergoing considerable change, with urbanization and development of commercial enterprises and transportation infrastructure. A working team of biologists has been formed to examine concerns for conservation of kit foxes in the Santa Nella region.

Kit foxes den in burrows in the ground that they excavate or enlarge from existing holes. These provide shelter from temperature extremes and provide a natal home. Small rodents are important prey species but the burrowing of both small mammals and foxes could undermine the integrity of canals, service roadways, and structures associated with control and movement of water. Consequently, damage from burrowing is vigorously controlled, by controlling the animals that burrow and by compacting and filling burrows. Project actions that involve disturbances to soil could potentially impact kit foxes.

Standard avoidance measures provided by CDFG and FWS are practiced to avoid take of kit foxes. Pre-activity surveys are conducted for kit foxes as part of standard avoidance measures. Filling holes, riprapping banks, and grading rights-of way eliminates potential den and escape sites. California ground squirrels are widespread and abundant in most project areas and they create much burrowing damage. Toxic baits are used to control these pests, but secondary poisoning could occur if foxes consume poisoned rodents or bait. Diversion of water into wasteways also may eliminate foraging habitat and flood dens. Holes which may be the dens of the kit fox are checked before they are filled. Pre-application surveys are undertaken prior to the use of rodenticides. No rodenticides other than zinc phosphide are used within a one-mile buffer zone of an active kit fox den.

Some pelleted products are legal to use by broadcast method within the range of the San Joaquin kit fox and pelleted anti-coagulant rodenticides may be harmful if fed upon. Small grain baits may be eaten, or may be an attractant for insects, which could be consumed and this may adversely affect the kit fox. A possible positive impact of the project is that the canal right-of-way may serve as a wildlife corridor to connect populations of the San Joaquin kit fox.

Any use of rodenticides will affect the prey base of the kit fox. Although rodent burrowing activities in some sections of the canal pose no structural threat and control may not be required (e.g. on upper cut slopes bordering canals), other sections of the canal may be vulnerable to severe damage from burrowing ground squirrels. Difficulty arises in implementing a coordinated effort between individual farmers who use rodenticides to prevent damage to their crops, such as almonds, and the use or application methods of rodenticides which may adversely affect the San Joaquin kit fox. The use and application methods of several types of rodenticides may, in fact, be legal to use in areas where kit fox may be adversely affected by their use. A case in point is the use of bait stations. Although the use of bait stations is the recommended method of application according to label instructions for certain rodenticides, some bait station designs have an opening of nearly four inches. This is large enough to allow access to bait by the kit fox or other animals with small heads, if the bait is scattered from the back bait compartment by feeding squirrels. Decreasing the opening to two and one-half inches prevents smaller animals from directly accessing the bait, while allowing squirrels to reach the bait.

A possible positive effect of the project is that the canal right-of-way may serve as a wildlife corridor to connect populations of the San Joaquin kit fox. If care is used in operations, use of the canal right-of-way could benefit the San Joaquin kit fox population.

*San Joaquin Woolly-threads (CDWR, FWUA, SLMWA, WWD)*

*Actions from Table 1:*

- Blading and disking of rights-of-way
- Blading of O&M roads
- Contact herbicide application
- Pre-emergent herbicide application
- Mowing rights-of-way

This species is an annual herb that occurs in Non-native Grassland, Valley Saltbush Scrub, Interior Coast Range Saltbush Scrub, and Upper Sonoran Shrub Scrub (Cypher 1994). The species could occur along the San Luis Canal near the Kettleman Hills (Kings County), and although suitable habitat for this species occurs elsewhere, the species itself is unlikely to occur elsewhere. It has been found on previously disked sites at low density adjacent to undisturbed populations (Lewis 1993, Taylor and Buck 1993). This species could be harmed by herbicides and mowing, blading, and disking of rights-of way on the San Luis Canal.

*Valley Elderberry Longhorn Beetle (CCRD, CCWD, FWUA, SLDMWA)*

*Actions from Table 1:*

- Aquatic weed contact herbicide application
- Blading and disking of rights-of-way
- Contact herbicide application
- Drain ditch and channel maintenance

Conversion of land for agriculture in the Central Valley near surface water sources (e.g. especially rivers) and in floodplain habitats where elderberry bushes grew likely reduced the amount of habitat to support this species. Elderberry bushes are found along the San Joaquin River and tributaries to this drainage, although they seem to be more abundant along on the east side of the valley than on the west. In addition to watercourses draining into the San Joaquin River, elderberry bushes are commonly found along the drainages that flow into the Tulare Lake Basin and the Kern River (e.g. especially the Kings, Kaweah and Tule Rivers). Elderberry bushes are not found on project areas in CCRD, but they are found in CCWD. The bushes in CCWD are outside the range of the Valley elderberry longhorn beetle.

There are numerous streamcourses that cross the MC, FKC, and DMC where these occur elderberry bushes could take root along laterals or channels which extend away from underdrains and overchutes. Elderberry bushes are not sprayed or removed and although measures are taken to prevent take of elderberry bushes, unexpected drift from herbicides or inadvertent mechanical removal of plants by personnel unfamiliar with plant identification, especially during the non-growing season, could result in take of plants. This is most likely to occur where lateral drains and channels leading from underdrains or overchutes, etc., are cleaned, because these plants are not associated with a riparian zone.

*Vernal Pool Fairy Shrimp (FWUA, MCWPA, SLDMWA)**Actions from Table 1:*

- Aquatic weed contact herbicide application
- Blading and disking of rights-of-way
- Blading of O&M roads
- Drain ditch and channel maintenance
- Pre-emergent herbicide application

Vernal pool fairy shrimp are found in vernal pools from in the Central Valley from Shasta to Tulare Counties. Surveys were just conducted for vernal pool fairy shrimp in pools and puddles along FKC and the MC. Potential specimens were found, but additional identification is ongoing. Locations of the pools were entered into GPS units and will be included as a layer on future GIS maps. The information is not yet available but will be provided to Service when it is available.

Pesticide spraying could adversely affect fairy shrimp because they may absorb toxic chemicals through their exoskeleton. They could also be adversely affected by earthmoving activities such as grading, blading, backfilling, and filling of low areas that may be breeding areas of shrimp in the wet season. Authorities will be notified of locations of where shrimp were found so they can



be avoided if possible. However, filling of some low pools that are inhabited might need to occur to protect the integrity of the canals. Cyst stages would most likely be affected by cleaning that takes place during the late summer or fall. The impacts would be most likely on the FKC between Woodlake and Friant Dam and along the MC.

*Vernal Pool Tadpole Shrimp (CCWD, CCRD, CDFG, FWUA, MCWPA, SLDMWA)*

*Actions from Table 1:*

- Aquatic weed contact herbicide application
- Blading and disking of rights-of-way
- Contact herbicide application
- Drain ditch and channel maintenance
- Pre-emergent herbicide application

This species is endemic to vernal pools from Shasta to Merced Counties. Vernal pool tadpole shrimp are found at San Luis National Wildlife Refuge, east of the DMC. Surveys were recently (March/April 2004) conducted for the tadpole shrimp in pools and puddles along the FKC and MC. No shrimp were found but additional surveys are planned while deeper pools still have water. Locations of the pools were entered into GPS units and will be included as a layer on future GIS maps. The information is not yet available but will be provided to Service when it is.

Spraying of herbicides could adversely affect tadpole shrimp because they may absorb chemicals through their exoskeleton. They could also be adversely affected by earthmoving activities such as grading, blading, backfilling, and filling or cleaning of low areas that may be breeding areas of shrimp in the wet season. Authorities will be notified of locations of where shrimp were found so they can be avoided if possible. However, filling of some low pools that are inhabited might need to be filled to protect the integrity of the canals.

### **Summary of Effects**

The effects of O&M activities are focused in specific areas for some species that inhabit specific habitats, whereas other species (e.g. San Joaquin kit fox) may be affected over a broader area. The primary impacts are likely to result from earth moving activities such as blading and erosion control, cleaning facilities, especially drainage courses and underchutes, removal or control of weedy vegetation, application of pesticides, and incidental vehicle or equipment strikes. Indirect effects that result in removal of habitat or contamination of the environment are more difficult to assess, but may occur nonetheless.

Of the species that occur within the action area, the following have the greatest likelihood of being affected by the O&M activities conducted at SCCAO features: California red-legged frog, blunt-nosed leopard lizard, giant garter snake, San Joaquin kit fox, California tiger salamander, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, and San Joaquin woolly-threads.

The blunt-nosed leopard lizard is not common in the project area, but is most likely to be affected where it occurs along the San Luis Canal and Coalinga Canal. Adverse effects are most likely to occur from blading, filling of erosion areas and mowing along canal rights of ways, but they may primarily be limited to areas of herbaceous rangeland on about a one mile segment along the Coalinga Canal and two to three mile section along the SLC near Dos Amigos Pumping Plant. Rodent control in these areas would reduce burrow availability.

Effects to California red-legged frog would most likely occur along the along Pacheco Tunnel, Pacheco Conduit, and Santa Clara Tunnel and primarily the first 5 miles of the Santa Clara Conduit; impacts thus would be most likely restricted to about 20 of the 35 miles of conveyance facilities. The frog would be exposed to impacts primarily during spring when they are moving about in upland habitats over the right-of-way. Vehicle strikes or contact with herbicides are the likely sources of harm. In CCWD, land surrounding the facilities is highly urbanized and there is little suitable habitat in the project area; however, the cleanout and removal of vegetation from drains, 10 laterals and 8 wasteways may result in take. Additionally, some exposure to herbicides would occur. At San Justo Reservoir, control of rodents at the dam and dike reduces the availability of burrow sites that could be used by dispersing individuals, but this effect is limited to a small area around the bait stations at the dam and dike (<10 acres).

California tiger salamanders are likely to be impacted in areas and by similar means described for California red-legged frogs above. Additionally, along the MC and the upper  $\frac{1}{3}$  of the FKC, filling of voids and blading or grading along the canals would affect this species. Because these animals are secretive and may remain in burrows or fissures in the ground for much of the year, it is difficult to fully assess the impact that blading, erosion control, void filling and canal liner repair have on salamander mortality. Additionally, contact with pesticides would have adverse effect, though the effect of doses experienced are not predictable.

Giant garter snakes are most likely to be affected by vegetation and rodent control activities along the San Luis Drain between Bass Avenue and the terminus, a distance of about 50 miles. Giant garter snakes may be affected by control of vegetation along ditches at Volta Wasteway Wildlife Area (Holding Reservoir), vegetation control along Volta Wasteway, and from channel maintenance on the main inlet channel (0.2 miles) to the Columbia Pumping Plant in CCRD.

San Joaquin kit fox can be found throughout most of the project area. The length of the Pacheco Conduit and Tunnel, the facilities in the vicinity of San Luis Reservoir, the last 10 miles of the SLD, the DMC from TPP to about State Highway 165 and Interstate 5, near Los Banos, about 80 miles of the FKC and the length of the CCC are within the range of the San Joaquin kit fox. Impacts are most likely to occur from blading, filling of erosion sites, inadvertent poisoning, vehicle strikes, and trespass on Reclamation land and mortality from shooting. These effects are most likely to occur on the southern  $\frac{1}{3}$  of the FKC and along the DMC from Los Banos north and in the vicinity of facilities near Santa Nella. Avoidance measures are followed to minimize impacts to San Joaquin kit fox and efforts are being made on the DMC to restrict trespass.

Elderberry plants that are habitat for the valley elderberry longhorn beetle (plants with stems one inch or greater in diameter) are located in few areas of the project; primarily at major river or

creek crossings along the FKC and along the MC. Inadvertent take from spraying or grading by an inexperienced employee could result in take, especially if plants are not fully leafed out. However, because the location of plants is generally known to O&M personnel, and elderberry plants are easily identifiable when leaves are present, they would not generally be affected. The Endangered Species website maintained by the Endangered Species Recovery Program (<http://www.esrp.org/cvp/esman/>) provides pictures of this plant so personnel responsible for O&M can learn to identify it.

Vernal pool fairy shrimp and vernal pool tadpole shrimp may be adversely affected by clearing of lateral drains along the FKC and MC that could provide habitat. Application of pesticides also could impact these species. Most likely cyst stages would be impacted from work that occurs during the fall. Since these species cannot readily be identified as being present in dry areas, avoidance of take is difficult.

Direct effects to listed species can be summarized as follows:

- mortality of individuals or groups from equipment strikes and damage
- mortality of individuals from alterations (i.e. burying) of occupied habitat
- disturbance of individuals in burrows
- displacement of individuals from habitat
- possible toxicity of chemical herbicides and pesticides from ingestion and/or exposure
- destruction of burrows, hibernacula, and habitat
- reduced prey availability

Indirect effects to listed species can be summarized as follows:

- changes in prey abundance over time
- changes in habitat suitability over time
- fewer small mammal burrows available for use as aestivation, cover, and hibernacula sites

### 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 and conference 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.

We do not anticipate a large number of cumulative effects because the action area consists primarily of Reclamation lands and facilities. However, the following non-federal activities are likely to occur in the action area.

County policy differs regarding the use of rodenticides within the range of the kit fox. Additionally, some pelleted products are legal to use by broadcast method within the range of the San Joaquin kit fox which may have an adverse effect. Some pelleted anti-coagulant rodenticides may be harmful in that the pellets may be easily fed upon by kit

foxes and would be within their foraging pattern of feeding upon beetles and small insects which would be the size of the pellets. Attractants such as fish oil are added some rodenticides and may make them more attractive to foxes as well as to squirrels. Until these products are reviewed concerning their use in the range of the San Joaquin kit fox, individual farmers and ranchers adjacent to the distribution system of the canal may continue to use products for rodent control which may have an adverse effect upon the fox. Rodent control by private landowners also is likely to reduce refuge habitat for the giant garter snake, California red-legged frog, and California tiger salamander.

Pesticide application, blading, mowing, trenching; installation and repair of structures, roads, fences, and utilities; and other activities routinely conducted on farm and ranch lands immediately adjacent to facilities will have the same effects as those described in this biological and conference opinion on the California red-legged frog, California tiger salamander, vernal pool fairy shrimp, valley elderberry longhorn beetle, blunt-nosed leopard lizard, vernal pool tadpole shrimp, San Joaquin wooly-threads, giant garter snake, San Joaquin kit fox; and proposed critical habitat for the California red-legged frog and California tiger salamander.

### **Conclusion**

After reviewing the current status of the protected species, the environmental baseline for the area covered by this biological and conference opinion, the effects of the proposed project, and the cumulative effects, it is the Service's biological opinion that the Operations and Maintenance occurring on Reclamation lands within the SCCAO, as proposed, is not likely to jeopardize the continued existence of the blunt-nosed leopard lizard, California red-legged frog, California tiger salamander, giant garter snake, San Joaquin kit fox, valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, and San Joaquin wooly-threads. The proposed project will not result in destruction or adverse modification of proposed critical habitat for the California red-legged frog and California tiger salamander.

We base our determination of no jeopardy on the implementation of the Conservation Measures as described in the project description. The effects described above are mostly very localized and small in magnitude and extent. Actions on linear facilities may cross a larger geographic area but the amount of disturbance in any specific area is still very localized. As stated above, because these activities are routine (e.g., they occur regularly), habitat in work areas is generally of low value because it is perpetually disturbed, although it may be adjacent to good quality habitat. We do not anticipate that conduct of these activities, as proposed, will not affect significant numbers of individuals, modify or remove significant amounts of habitat, or result in significant reduction in reproduction, numbers or distribution of either local populations or the species as a whole.

We base our determination of no adverse modification of proposed critical habitat on the fact that the affected PCE's are of marginal quality and do not provide a significant conservation role for either the California red-legged frog or the California tiger salamander. Most of the O&M activities do not result in permanent destruction of habitat, but rather chronic or periodic disturbance. Vegetation grows back, erosion forms new crevices, rodent populations re-establish

and make new burrows, trenches are re-filled. As a result, the affected critical habitat will retain its current ability to establish primary constituent elements lost or disturbed by O&M activities.

## INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking 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 this Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of the Act, which refer to terms and conditions and exemptions on taking listed fish and wildlife species, do not apply to listed plant species. However, section 9(a)(2) of the Act prohibits removal, reduction to possession, and malicious damage or destruction of listed plant species on Federal lands and the removal, cutting, digging up, or damaging or destroying such species in knowing violation of any State law or regulation, including State criminal trespass law. Actions funded, authorized or implemented by a Federal agency that could incidentally result in the damage or destruction of such species on Federal lands are not a violation of the Act, provided the Service determines in a biological opinion that the actions are not likely to jeopardize the continued existence of the species.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

### **Amount or Extent of Take**

The Service anticipates incidental take of blunt-nosed leopard lizard, California red-legged frog, California tiger salamander, giant garter snake, San Joaquin kit fox, valley elderberry longhorn beetle, vernal pool fairy shrimp and vernal pool tadpole shrimp to occur as a result of the proposed project. The estimated take will occur over a period of 25 years as a result of habitat

loss, ground disturbance, environmental contamination and exposure to pesticides, equipment strikes, reduction of prey base and refuge habitat, entombing or crushing in hibernacula, or flooding.

#### Blunt-nosed leopard lizard

We anticipate the annual amount of take as a result of project related activities that result in injury, harm, and mortality will not exceed 3 acres annually of blunt-nosed leopard lizard habitat patches and, if individuals are present, then the individuals therein.

NOTE: The blunt-nosed leopard lizard is a fully protected species under California law (California Fish and Game Code § 5050), and no injury or killing of this reptile is authorized by California law. The exemption from section 9 of the Act provided by this Incidental Take Statement for the blunt-nosed leopard lizard does not exempt Reclamation and its contractors from complying with State law.

#### California red-legged frog

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect because when this amphibian is not in their breeding ponds, it inhabits the burrows of ground squirrels or other rodents, or may be difficult to locate due to their cryptic appearance and behavior; the sub-adult and adult animals may be located a distance from the breeding ponds; the migrations occur on a limited period during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of their relatively small body size. Losses of this species also may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in water regime at their breeding ponds, or additional environmental disturbances. Therefore, the Service is estimating that all California red-legged frogs that may inhabit lands described in the **Description of the Proposed Action** and **Environmental Baseline** of this biological and conference opinion will be subject to incidental take

We anticipate the annual amount of take as a result of project related activities that result in injury, harm, harassment and mortality will not exceed 10 acres annually of California red-legged frog habitat and, if individuals are present, then the individuals therein.

#### California tiger salamander

The Service anticipates that incidental take of the California tiger salamander will be difficult to detect because when this amphibian is not in their breeding ponds, or foraging, migrating, or conducting other surface activity, it inhabits the burrows of ground squirrels or other rodents; the burrows may be located a distance from the breeding ponds; the migrations occur on a limited period during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of their relatively small body size. Losses of this species also may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in water regime at their breeding ponds, or additional environmental disturbances. Therefore, the Service is estimating that all California tiger salamanders inhabiting lands associated with the facilities described in the **Description of the Proposed Action** and

**Environmental Baseline** of this biological and conference opinion, will be subject to incidental take

We anticipate the annual amount of take as a result of project related activities that result in injury, harm, harassment and mortality will not exceed 20 acres annually of California tiger salamander habitat and, if individuals are present, then the individuals therein.

Giant garter snake

The Service anticipates incidental take of the giant garter snake will occur for the reasons described above in the **Effects of the Proposed Action** section. Giant garter snakes are secretive and highly sensitive to human activities. Individual snakes are difficult to detect unless they are observed, undisturbed, at a distance. Most close-range observations represent chance encounters that are difficult to predict. Therefore, the Service is estimating that all giant garter snakes associated with the facilities described in the **Description of the Proposed Action and Environmental Baseline** will be subject to incidental take.

We anticipate the annual amount of take as a result of project related activities that result in injury, harm, harassment and mortality will not exceed 3 acres annually of giant garter snake habitat and, if individuals are present, then the individuals therein.

San Joaquin kit fox

We anticipate the following amount of take as a result of project related activities that result in injury, harm, harassment and mortality:

- a. The annual amount of take of San Joaquin kit fox natal dens is zero (0).
- b. The annual amount of take as a result of project related activities that result in harm will not exceed 25 acres annually of San Joaquin kit fox habitat.
- c. The amount of take as a result of project related activities that result in injury or death is five (5) San Joaquin kit fox for the life of the project (25 years).

Valley elderberry longhorn beetle

The Service anticipates incidental take of the valley elderberry longhorn beetle will be difficult to detect or quantify. The cryptic nature of this threatened species and its relatively small body size make the finding of an injured or dead specimen unlikely. The animal occurs in habitats that make it difficult to detect. Due to the difficulty in quantifying the number of valley elderberry longhorn beetles that will be taken as a result of the proposed project, the Service is quantifying take incidental to the project as all individuals inhabiting or otherwise utilizing individual stems of elderberry shrubs.

The annual amount of take as a result of project related activities that result in injury, harm, harassment and mortality will not exceed 3 stems annually and, if individuals are present, then the individuals therein.

Vernal pool fairy shrimp



The Service anticipates incidental take of the vernal pool fairy shrimp will be difficult to detect or quantify. The cryptic nature of these species, particularly during the dry phase of a pool when they exist in the soil as cysts, and their relatively small body sizes make the finding of any dead specimen unlikely. In addition, not all cysts hatch every year, so individuals are likely to be present as cysts even during the aquatic phase of a pool when individuals that have hatched that year are easier to detect and identify. These species are difficult to detect and impossible to count as individuals in either the aquatic or dry stage of the pool.

We anticipate the annual amount of take as a result of project related activities that result in injury, harm, harassment and mortality will not exceed 0.25 acres annually of seasonal depressions and the individuals therein.

#### Vernal pool tadpole shrimp

The Service anticipates incidental take of the vernal pool tadpole shrimp will be difficult to detect or quantify. The cryptic nature of these species, particularly during the dry phase of a pool when they exist in the soil as cysts, and their relatively small body sizes make the finding of any dead specimen unlikely. In addition, not all cysts hatch every year, so individuals are likely to be present as cysts even during the aquatic phase of a pool when individuals that have hatched that year are easier to detect and identify. These species are difficult to detect and impossible to count as individuals in either the aquatic or dry stage of the pool.

We anticipate the annual amount of take as a result of project related activities that result in injury, harm, harassment and mortality will not exceed 0.25 acres annually of seasonal depressions and the individuals therein.

Upon implementation of the following reasonable and prudent measures, incidental take associated with the O&M occurring on Reclamation lands within the SCCAO on the above species in the form of harm, harassment, or mortality from habitat loss or direct mortality will become exempt from the prohibitions described under section 9 of the Act for direct and indirect impacts.

#### **Effect of the Take**

Service has determined that this level of anticipated take is not likely to result in jeopardy to the blunt-nosed leopard lizard, California red-legged frog, California tiger salamander, giant garter snake, San Joaquin kit fox, valley elderberry longhorn beetle, vernal pool fairy shrimp and vernal pool tadpole shrimp. We base our determination on the implementation of the Minimization and Avoidance Measures as described in the project description.

#### **Reasonable and Prudent Measures**

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the listed species discussed in this opinion:

Minimize the project effects to the listed species and their habitat throughout the proposed action area.

### Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Bureau of Reclamation will comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

The following Term and Condition will implement Reasonable and Prudent Measure number one (1):

1. The Bureau of Reclamation shall include a copy of this biological opinion with its solicitations for construction and maintenance of the proposed project making the prime contractor responsible for implementing all requirements and obligations included within this biological opinion, and to educate and inform all other subcontractors involved in the project as to the requirements of the biological opinion.
2. Use of rodenticides and herbicides at the project site shall be utilized in such a manner to prevent primary or secondary poisoning of California tiger salamander, giant garter snake, valley elderberry longhorn beetle, and the California red-legged frog, and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other appropriate State and Federal regulations, as well as additional project-related minimization or avoidance measures as described in this biological opinion restrictions or deemed necessary by the California Department of Fish and Game.
3. Prior to groundbreaking, high visibility fencing that is at least 4 feet tall shall be placed in a manner that prevents encroachment of maintenance personnel and equipment into suitable habitat of the California tiger salamander, giant garter snake, valley elderberry longhorn beetle, and/or the California red-legged frog. The fencing shall be inspected before the start of each work day by the on-site biologist and maintained by the Bureau of Reclamation until completion of the project. The fencing may be removed only when the project is completed.
4. If the project is not completed before the onset of fall or winter rains, each morning following a night that has any measurable precipitation, before work begins, the on-site biologist shall examine the work site for the California tiger salamander and California red-legged frog, including open pipes, and beneath vehicles. If a California tiger salamander or California red-legged frog is discovered, the on-site biologist shall carefully remove the animal(s) by hand, photograph it (dorsal side), and placed it at the entrance to a suitable rodent burrow within walking distance of the excavation site, but outside of the area where the animal could be injured or killed by maintenance activities. The California tiger salamander shall be monitored until it enters the burrow. If a

California red-legged frog is discovered, the on-site biologist shall place it in suitable habitat in the general vicinity of the maintenance site within walking distance but outside of the area where the animal could be injured or killed by project activities. The Deputy Assistant Field Supervisor (Endangered Species Program) at the Sacramento Fish and Wildlife Office shall be notified of the incident by electronic mail within one (1) working day. A copy of the photograph shall be provided to the Service.

5. Plastic mono-filament netting (erosion control matting) or similar material should not be used for erosion control or other purposes at the project site if the mesh size is such that giant garter snakes, California tiger salamanders and/or California red-legged frogs may become entangled, and then killed through trampling, exposure or predation. Acceptable substitutes include large mesh size coconut coir matting or tackified hydroseeding.
6. Upon completion of the project, all habitat of the California tiger salamander, giant garter snake, valley elderberry longhorn beetle, and/or the California red-legged frog subject to temporary ground disturbance, including storage and staging areas, temporary roads, et, shall be re-contoured, if appropriate, and revegetated with locally collected (e.g., within 10 miles of the project site) seeds and/or cuttings of appropriate native plant species to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the project, but that after project completion will not be subject to further disturbance and has the potential to be revegetated. The Bureau of Reclamation shall ensure the methods and plant species used to revegetate using locally collected seeds or cuttings of appropriate native plant species have been approved by the Service. The on-site biologist shall ensure that areas subject to temporary disturbance have been adequately restored.
7. All earth disturbing O&M activities within giant garter snake habitat shall be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct effects are lessened because snakes are actively moving and avoiding danger. More danger is posed to snakes during their inactive period because they are occupying underground burrows or crevices and are more susceptible to direct effects, especially during excavation. Between October 2 and April 30, contact the Service's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.
8. To the extent feasible, the Bureau of Reclamation shall confine clearing of vegetation and scraping, or digging of soil to the minimal area necessary to facilitate O&M activities.
9. Where O&M actions include a canal or linear waterway, Reclamation shall conduct the O&M actions on one side of the waterway at a time allowing giant garter snakes that may be in the area to escape to the other side of the waterway.
10. Within two (2) calendar years of the issuance date of this biological opinion, the Bureau of Reclamation shall develop a final Integrated Pest Management Plan that addresses the Bureau of Reclamation's compliance pursuant to the Federal Insecticide Fungicide and

Rodenticide Act (FIFRA), as amended, Federal Noxious Weed Act, Carlson-Foley Act, and applicable State and local laws and standards that address compliance with the ESA and with the intent of eliminating or reducing take of listed species.

- a. The Bureau of Reclamation shall prepare the Plan in consultation with the Service. The plan shall include, at a minimum, identification and proper management of pests on Reclamation lands and at The Bureau of Reclamation-owned facilities and the potential effects of proposed pest management activities on federally-listed species. Reclamation shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the Service, and specific descriptions of how the Services' comments relative to efforts on listed species are accommodated by the plan. The Bureau of Reclamation shall allow a minimum of 30 days for the agencies to comment and to make recommendations. If the Bureau of Reclamation does not adopt a recommendation, the Bureau of Reclamation must document the bureau of Reclamation's reasons, based on project-specific information.

### **Reporting Requirements**

The Sacramento Fish and Wildlife Office is to be notified within one (1) working day of the finding of any dead or injured listed wildlife species or any unanticipated take of the species addressed in this biological and conference opinion. Any contractor or employee who during routine operations and maintenance activities inadvertently kills or injures a listed wildlife species must immediately report the incident to their representative. The Service contact person for this is the Chief, Endangered Species Division, at (916) 414-6620.

Any dead or severely injured valley elderberry longhorn beetles found (adult, pupae, or larvae) shall be deposited in the Entomology Department of the California Academy of Sciences. The Academy's contact is the Senior Curator of Coleoptera at (415) 750-7239.

All observations of Federally listed species—live, injured, or dead—shall be recorded on California Natural Diversity Data Base (CNDDB) field sheets and sent to California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1416 Ninth Street, Sacramento, California 95814.

Reclamation must provide Service with annual reports to describe the progress of implementation of all the commitments in the Conservation Measures and Terms and Conditions sections of this biological and conference opinion. The first report is due January 31, the first year after the issuance of this biological and conference opinion, and bi-annually thereafter.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

1. Reclamation should continue to work with the Service to implement provisions of the CVPIA Programmatic Biological Opinion (CVPIA PBO) that will further the recovery of listed species and minimize habitat loss within areas currently served, or which are scheduled in the future to be served with CVP water, emphasizing the following:
  - a. CVP Conservation Program: Increase funding levels to account for erosion of value as a result of inflation over the past 10 years; [p. 2-61]
  - b. Work with the SFWO to increase the effectiveness of the Land Use Monitoring and Reporting Program for detecting changes in lands which are important for the conservation of listed species; [p. 2-63 and 2-64]
  - c. The commitment in the CVPIA PBO to provide necessary information to SFWO in situations where a determination of *no effect* has been made, sufficiently in advance to enable the Service to review; [p. 2-70]
  - d. Ensure that all commitments associated with long-term renewal of CVP water service contracts are in place prior to executing long term contracts; [p. 2-54 to 2-56]
  - e. The procedures for exclusions and exclusions on page 2-40;
  - f. We request the further cooperation of Reclamation in notifying SFWO when scheduling M&I deliveries to areas or in amounts not previously delivered. Reclamation should notify CVP contractors that the consultations on the contract renewals does not exempt private parties from the prohibitions of section 9 of the Act for incidental take that may result from the use or application of CVP water. [p. 2-55].
2. We request that, prior to deeming an annual delivery schedule to be "satisfactory" under subsection (b) of Article 4, the Contracting Officer provide the Service with a copy of the water district's water delivery schedule if (and only if) the amount of M&I water being requested or scheduled is increasing over the amount of M&I water that was scheduled in the preceding delivery schedule. At that time we can work with Reclamation to determine whether an appropriate conservation strategy is in place for this water service area in accordance with the CVPIA programmatic biological opinion (page 2-55, #5), evaluate current information, and ensure that consistent with this consultation on the contract renewal and Reclamation's commitments in the CVPIA programmatic biological opinion.

**REINITIATION--CLOSING STATEMENT**

This concludes formal consultation on the proposed O&M occurring on Reclamation lands within the SCCAO. 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 maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

This concludes the conference for effects of SCCAO O&M activities on proposed critical habitat for the California red-legged frog and California tiger salamander. You may ask the service to confirm the conference opinion as a biological opinion issued through formal consultation if the critical habitat is designated. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

After designation of critical habitat for the California red-legged frog and California tiger salamander, Reclamation shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

Please contact Michael Welsh or Jan Knight of this office at (916) 414-6656, if you have any questions regarding this biological opinion.

Attachments

**LITERATURE CITED**

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#### **Personal Communications**

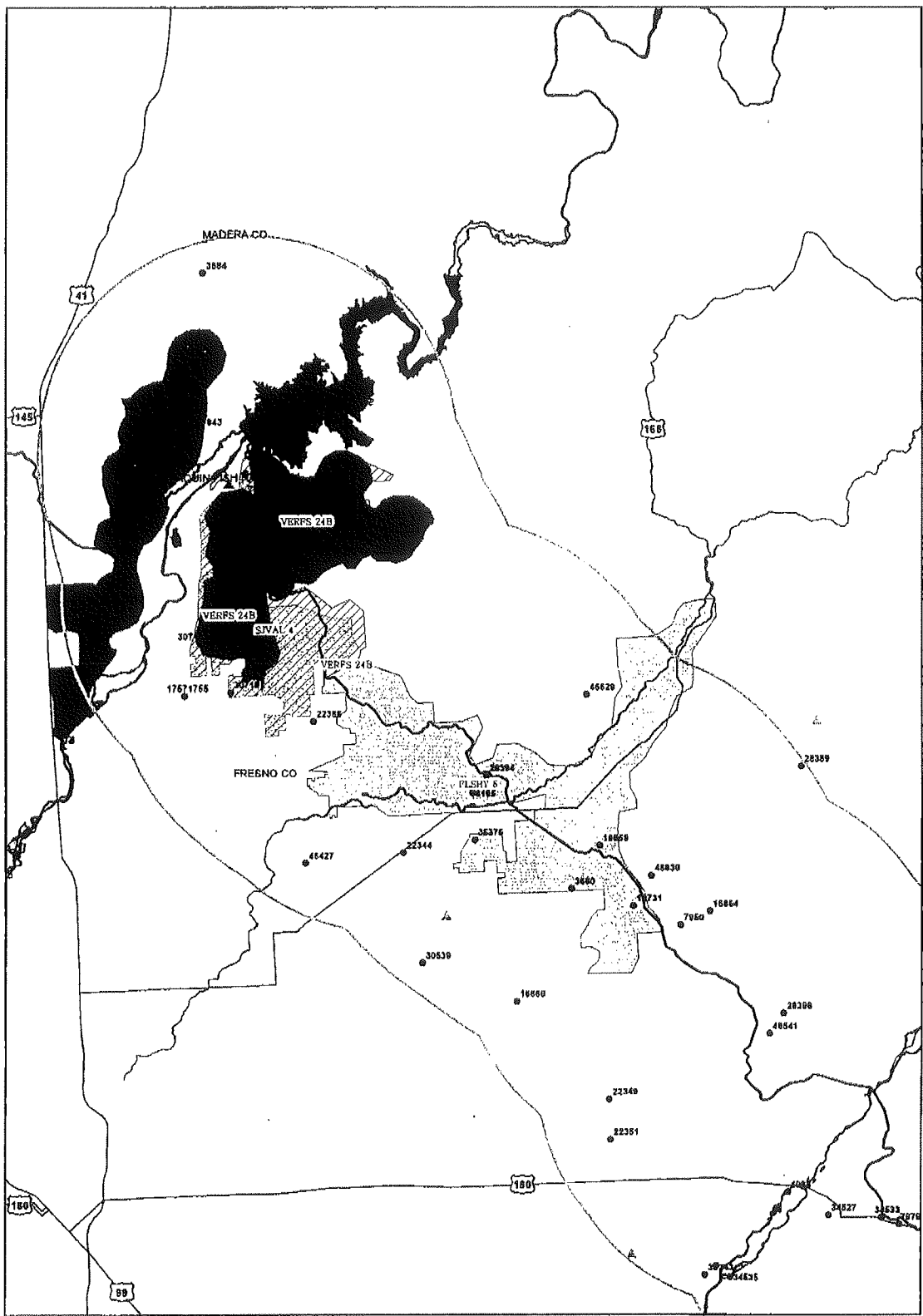
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Dickert, Catherine. California Department of Fish & Game.

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Attachment A

MAPS: 8½ x 11



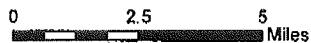
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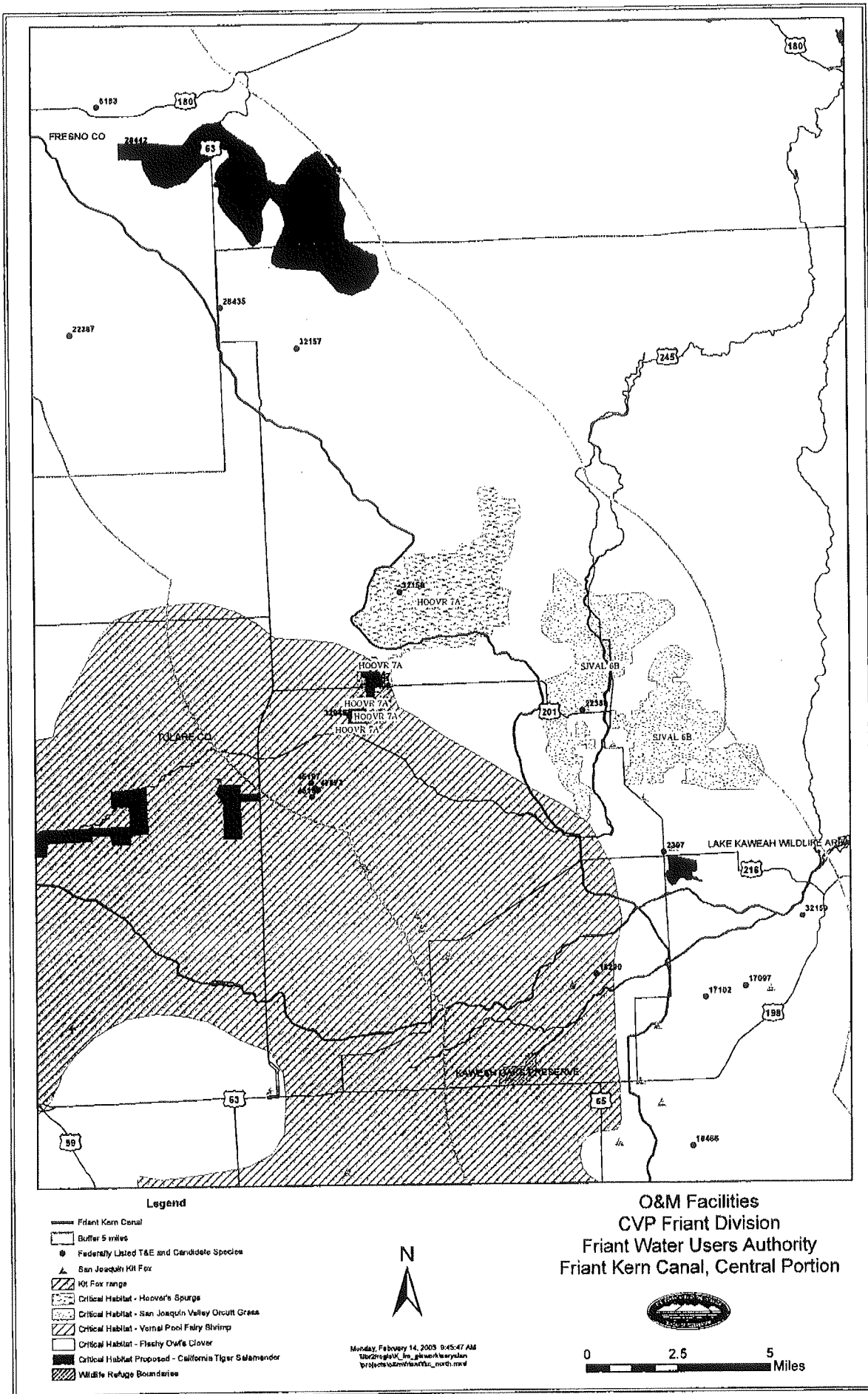
- Friant Kern Canal
- Buffer 5 miles
- Federally Listed T&E and Candidate Species
- San Joaquin Kit Fox
- Kit Fox range
- Critical Habitat - Hoover's Spurge
- Critical Habitat - San Joaquin Valley Orcutt Grass
- Critical Habitat - Vernal Pool Fairy Shrimp
- Critical Habitat - Fleshy Owl's Clover
- Critical Habitat Proposed - California Tiger Salamander
- Wildlife Refuge Boundaries



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**O&M Facilities  
 CVP Friant Division  
 Friant Water Users Authority  
 Friant Kern Canal, Northern Portion**





- Legend**
- Friant Kern Canal
  - Buffer 5 miles
  - Federally Listed T&E and Candidate Species
  - ▲ San Joaquin Hill Fox
  - ▨ Hill Fox range
  - ▨ Critical Habitat - Hoover's Spurge
  - ▨ Critical Habitat - San Joaquin Valley Orcutt Grass
  - ▨ Critical Habitat - Vernal Pool Fairy Shrimp
  - ▨ Critical Habitat - Freshy Owl's Clover
  - ▨ Critical Habitat Proposed - California Tiger Salamander
  - ▨ Wildlife Refuge Boundaries

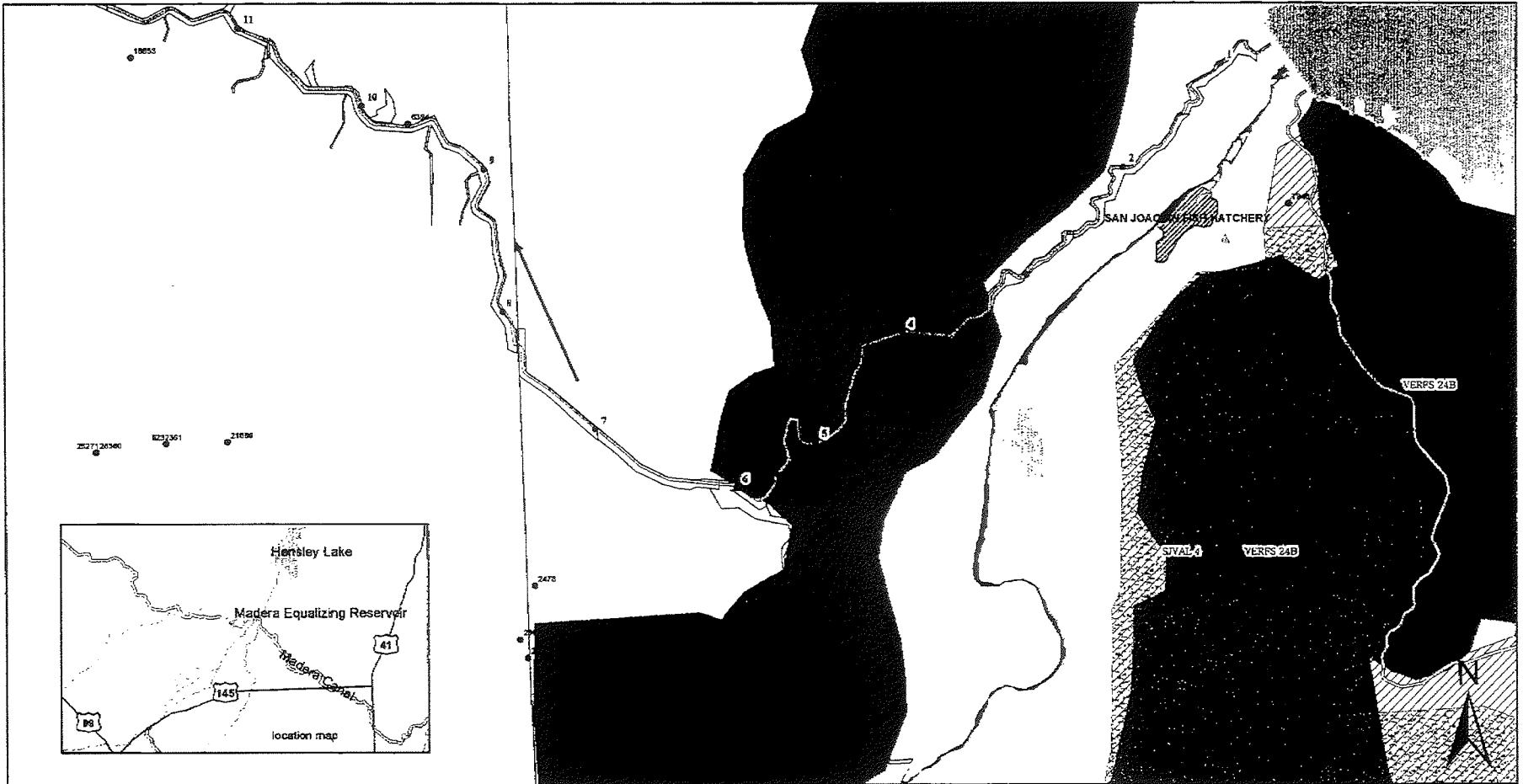


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O&M Facilities  
 CVP Friant Division  
 Friant Water Users Authority  
 Friant Kern Canal, Central Portion



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**Legend**

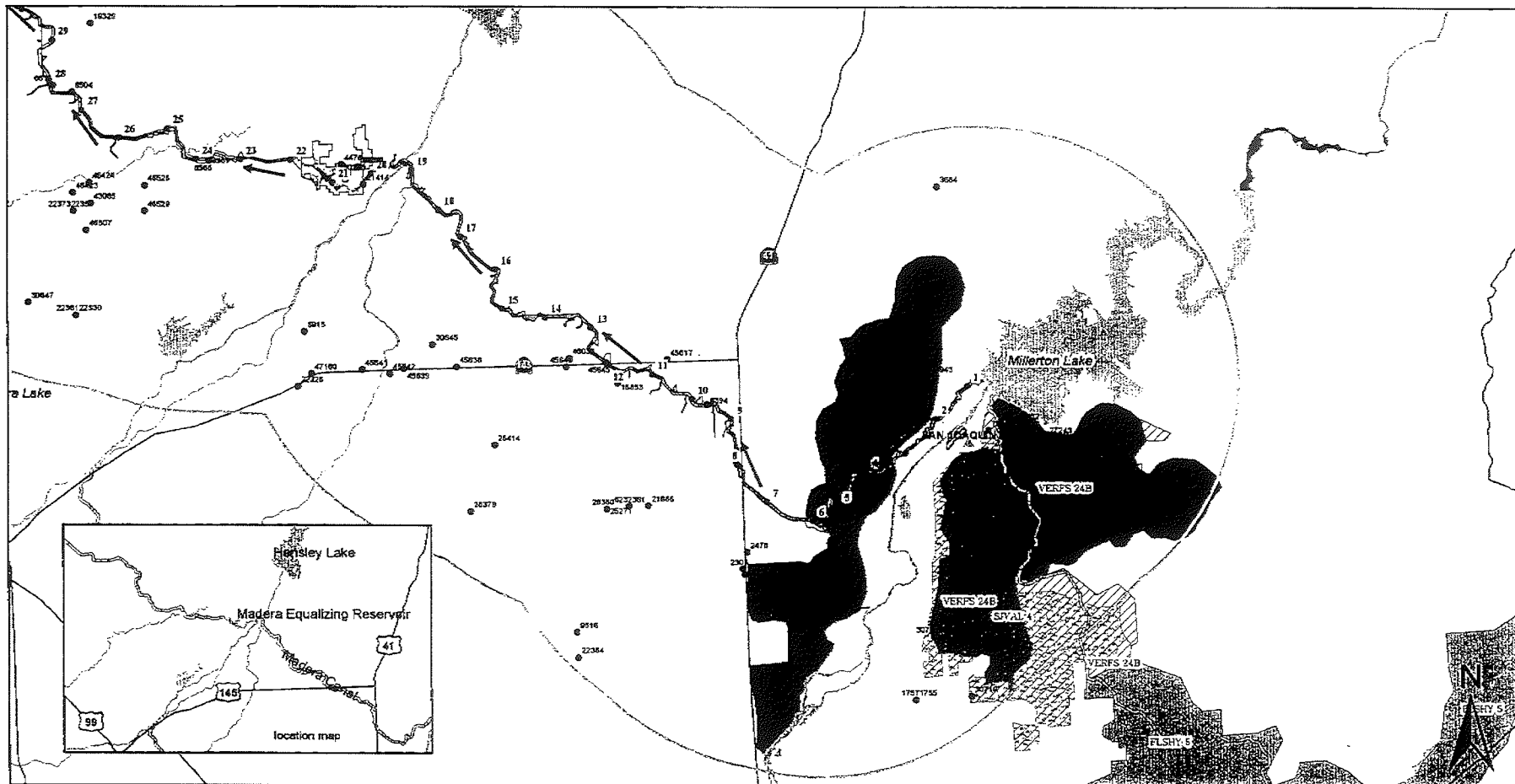
- Threatened, Endangered and Proposed Species
- ▲ San Joaquin Kit Fox
- mileposts
- right-of-way
- ← direction of water flow
- Buffer 5 miles
- ▨ Wildlife Refuge Boundaries
- ▧ Kit Fox range
- ▩ Critical Habitat Proposed - California Tiger Salamander
- ▨ Critical Habitat - Vernal Pool Fairy Shrimp
- ▨ Critical Habitat - San Joaquin Valley Orcutt Grass

**CVP Friant Division  
Madera-Chowchilla Water & Power Authority  
Madera Canal - Milepost 1-10**



**DISCLAIMER**  
This map is provided to be a graphical representation only. It is not a legal document and is not intended to be used as such. The Bureau of Reclamation gives no guarantee, expressed or implied, as to the accuracy or reliability of the data.

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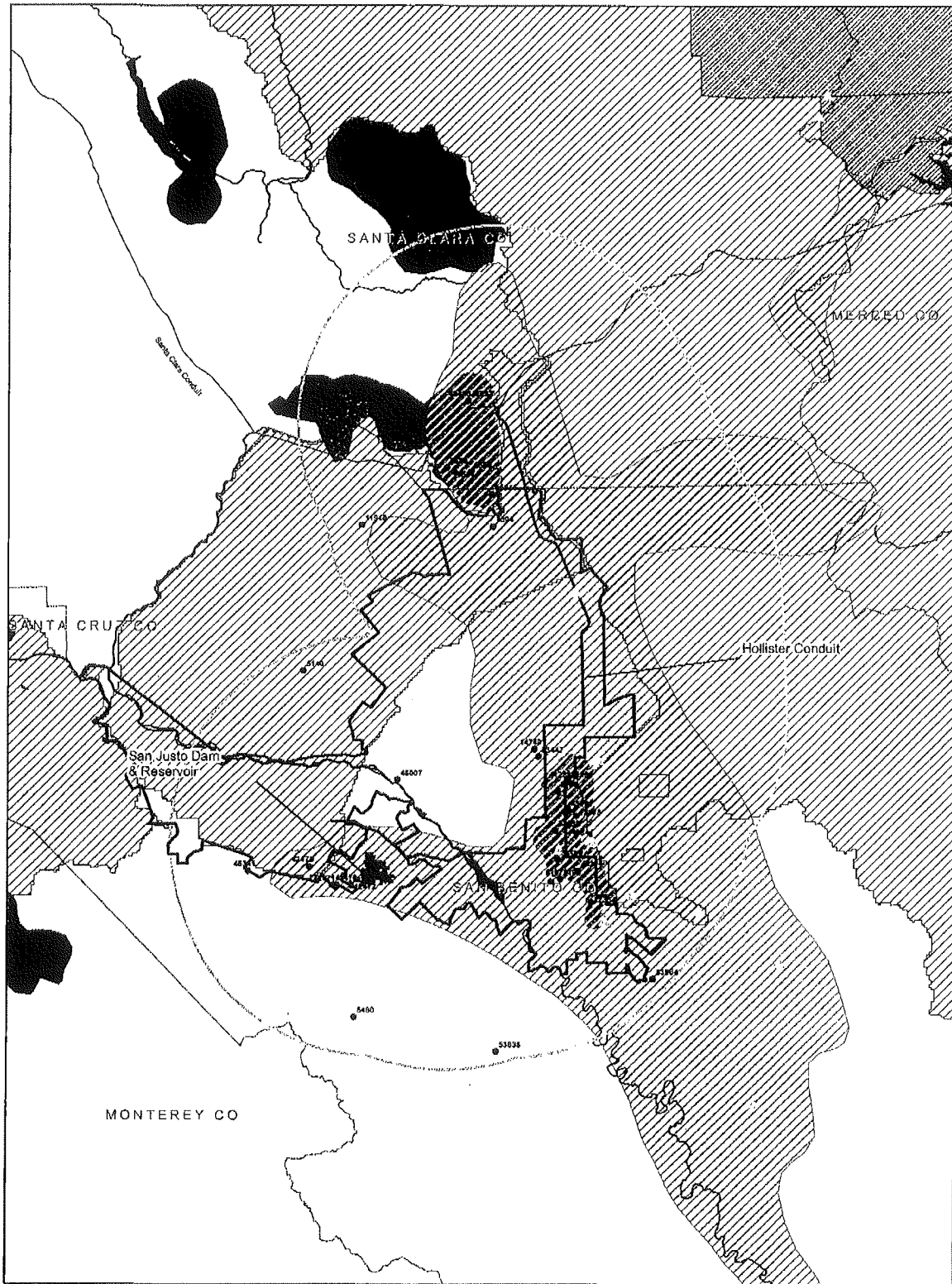
- Threatened, Endangered and Proposed Species
- ▲ San Joaquin Kit Fox
- mileposts
- ▭ right-of-way
- ➔ direction of water flow
- ▭ Buffer 5 miles
- ▨ Wildlife Refuge Boundaries
- ▨ Kit Fox range
- ▨ Critical Habitat Proposed - California Tiger Salamander
- ▨ Critical Habitat - Vernal Pool Fairy Shrimp
- ▨ Critical Habitat - San Joaquin Valley Orcutt Grass
- ▨ Critical Habitat - Fleasly Owl's Clover

**CVP Friant Division  
Madera-Chowchilla Water & Power Authority  
Madera Canal - South Half**



TERMINAL  
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The Bureau of Reclamation does not guarantee,  
express or implied, as to the accuracy or reliability of the data.

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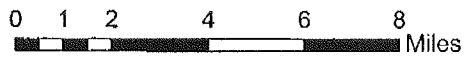
**Legend**

- ★ Facilities
- Buffer 5 miles
- Federally Listed T&E Species
- △ San Joaquin Kit Fox
- ▭ San Benito County Water District
- Critical Habitat Proposed - California Tiger Salamander
- ▨ Critical Habitat - Red Legged Frog
- ⊞ Kit Fox range



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**CVP San Felipe Division  
 San Benito County Water District  
 O&M Facilities**



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Attachment B

Table 2: Routine O&M Activities on Terrestrial SCCAO Facilities



Routine O&M Activities on Terrestrial SCCAO Facilities – 2004 Programmatic O&M Consultation				
Description of Routine O&M Activity	Species	Comprehensive O&M Design Criteria		
		Screening Process	Species Avoidance/ Take Minimization Steps	Residual Effects/Determination Statements
<p>1 <b>Aquatic Weed Contact Herbicide Application.</b> Herbicides registered for use in California by the U.S. Environmental Protection Agency and the California Department of Pesticide Regulation are applied to vegetation growing in aquatic sites such as in ditches, ponds, reservoirs, forebays, or other aquatic habitats, or at sites below the high water mark in areas subject to inundation, such as on the interior bank of canals. Vegetation that limits conveyance of water, reduces operational capabilities of facilities (e.g. by cracking liners or fouling pumps), restricts conveyance (e.g. clogs waterways), utilizes water resources, is invasive, or otherwise is a nuisance is controlled. Herbicides are delivered from pressurized tanks and sprayed from vehicle mounted booms, via backpack sprayers or other application rig, or by manually wicking herbicides directly onto vegetation. Aerial spraying is generally not conducted. Applications are made following the herbicide label instructions and are timed to occur when weeds are most susceptible, usually when plants are young or are actively growing (commonly as early as March or as late as October), although this depends on the mode of action of the herbicide and plant phenology. The extent of treated area varies on projects depending on weed distribution and pressure.</p> <p>Control of vegetation is conducted at the intake and along Contra Costa Canal and its wasteways, at Martinez Reservoir, in toe drains along the San Luis Canal, on unlined sections of the Friant-Kern Canal, at experimental sites, such as along the San Joaquin River where new chemical treatment regimens are studied, and at the inlet channel for the PV Pumping Plant and Coalinga Canal. Additionally, lateral drainage ditches are treated as needed. Vehicles used during the action disturb aquatic and riparian associated fauna. Treated habitats may expose listed species or their food to toxins. Indirect impacts include loss of vegetation that serves as potential habitat for listed species or their prey.</p>	<p>CRLF, CTS, GGS, VELB, VPFS</p> <p>Critical Habitat (CH): CTS, CRLF, Vernal pool species</p>	<p>Review Local Service Manual (LSM) for species descriptions, their distributions and habitat use; identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species; review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area; Surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow the California Department of Pesticide Regulation County Recommendations for Pesticide Applications; obtain written recommendation for pesticide application; obtain approvals for pesticide application; insure application equipment is calibrated so excess material is not applied. For areas where GGS may be present, apply material when GGS are in hibernacula, if possible. No pesticides will be used that may harm VELB or elderberry plants within 100 feet of any plant with a stem diameter 1.0 inch or greater in diameter. Adhere to NPDES permit plan. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on these species in the project areas, with the following exceptions. Herbicides applied to project areas may be toxic when encountered by CTS, CRLF, GGS and VPFS. Indirect effects from this activity include the reduction of vegetative cover in aquatic and riparian environments that may support prey and provide cover for CRLF and GGS. Herbicides may disperse and inadvertently contact elderberry plants.</p> <p>CH. The action is not conducted in areas that contain proposed or designated critical habitat.</p>

Routine O&M Activities on Terrestrial SCCAO Facilities – 2004 Programmatic O&M Consultation				
Description of Routine O&M Activity	Species	Comprehensive O&M Design Criteria		
		Screening Process	Species Avoidance/ Take Minimization Steps	Residual Effects/Determination Statements
<p>2. <b>Blading and Discing of Right-of-Way.</b> A grader or tractor with mounted blade or disc is used to scrape or shallowly till the soil to kill, prevent, or retard growth or spread of weeds, to reduce cover for pests, and to limit vegetation fuel load while providing fire breaks. Blading is practiced, in part, to reduce reliance on chemical herbicides and minimize development of herbicide resistance in weeds. Blading and discing is conducted along rights of way (following canals and pipelines or conduits and their access routes) and around support facilities and structures. These activities occur at the intake and along the CC-Canal, below Contra Loma Reservoir, along the Columbia Diversion Channel and the Columbia - Ridge Ditch Delivery Canal, along the San Luis Canal, on the top embankments, alongside traveled roads and areas adjacent to the canal embankment over the entire length of the FK-Canal, along the DM-Canal and associated wasteways and SL-Drain, along the Coalinga Canal, and at Friant Dam Support Facilities. Blading and discing may be conducted at any time of year, but is concentrated in the dry period (March-November). The action may be conducted once to several times a year, as needed to control weedy vegetation. Blading and discing removes vegetation that may provide forage or cover to prey species. Burrows in the soil may be damaged or destroyed and associated ground dwelling species may be harmed by equipment.</p>	<p>BNLL, CTS, CRLF, GGS, GKR, SJKF, TKR, VPFS, Plants (SJWT, Elderberry Plants)</p> <p>CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use; identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species; review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area; conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for Kit Fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, and follow USFWS Plant Survey Guidelines.</p>	<p>Follow O&amp;M Guidelines avoidance measures; follow the IPM Plans; follow guidelines for soil disturbance that may affect BNLL, GGS, K-Rats, and SJKF. For SJKF, a search to locate animal burrows occurring in rights of ways within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. When possible, in areas where GGS is present, the action should be conducted within periods of GGS activity (May to Oct), and during warm weather. Similarly, in areas where BNLL is present, the action should be conducted during warm weather to allow this species to move away from the disturbance. Initial ground-disturbing activities in areas where leopard lizards are present will be scheduled to allow for blunt-nosed leopard lizard capture and relocation between 15 April and 1 July. Erect tape or other barricades if needed to protect elderberry plants or burrows inhabited by listed species that are in the right of way and follow avoidance measures. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there are no direct effect of this action on SJKF, GKR, TKR, or for the other species in the project areas, with the following exceptions: blading or discing along the Firebaugh wasteway, Newman wasteway, San Luis Drain, and on the Columbia diversion canal and unlined portions of the Contra Costa Canal may affect the GGS during spring and fall, as GGS move between aquatic and upland sites when leaving or seeking hibernacula. BNLL, CTS and CRLF present in shallow burrows along rights of ways are subject to strikes from equipment. Indirect effects occur to listed species, including kangaroo rats, SJKF, BNLL, CTS, and CRLF when burrows of small mammals are damaged or destroyed by the action. Low spots along the FK-Canal and Madera Canal that are disced may destroy VPFS and their habitat. Lastly, San Joaquin Woolly-threads colonizing disturbed grassland sites along San Luis Canal could be destroyed by this action.</p> <p>CH: Will Not Adversely Modify Critical Habitat (WNM) – The action doesn't disrupt the vernal pool systems, only creates temporary disturbances on already disturbed areas. The actions don't preclude travel, except during the activity itself.</p>

Routine O&M Activities on Terrestrial SCCAO Facilities – 2004 Programmatic O&M Consultation				
Description of Routine O&M Activity	Species	Comprehensive O&M Design Criteria		
		Screening Process	Species Avoidance/ Take Minimization Steps	Residual Effects/Determination Statements
<p>3. <b>Blading of O&amp;M Roads.</b> A grader or tractor with mounted blade is used to scrape unpaved roadways and road shoulders to remove weedy vegetation, ruts, and to level and maintain the surface for access to the project. Blading O&amp;M non-paved roads is conducted once annually along approximately 25 miles of the CC-Canal, annually on about 150 miles of roadway along the FK-Canal, annually on 36 miles of roadway along the Madera Canal, annually on about 111 miles of roadway along the DM-Canal and associated wasteways, on about 58 miles of roadway on each side of the San Luis Drain, once annually during spring (March) along the inlet canal at PVPP and along the Coalinga Canal, a distance of approximately 28 total miles, along the San Luis Canal, and along access roads at Volta Wildlife Area. Blading occurs during the dry season, primarily from May through November. Machinery disturbs soil on the roadway and on the shoulders. Animals that occur on roadways or the shoulders may be struck by equipment. Vegetation providing food and/or cover for listed species or habitat for prey is removed. Burrows on road shoulders are damaged or destroyed.</p>	<p>BNLL, CTS, CRLF, GGS, GKR, TKR, SJKF, Plants (SJWT)  CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use; identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species; review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area; Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG Kit Fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, follow USFWS Plant Survey Guidelines.</p>	<p>Follow O&amp;M Guidelines avoidance measures; follow the IPM Plans; follow guidelines for soil disturbance that may affect BNLL, GGS, K-Rats, and SJKF. For SJKF, a search to locate animal burrows occurring in rights of ways within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. When possible, in areas where GGS is present, the action should be conducted within periods of GGS activity (May to October), and during warm weather. Similarly, in areas where BNLL is present, the action should be conducted during warm weather to allow this species to move away from the disturbance. Initial ground-disturbing activities in areas where leopard lizards are present will be scheduled to allow for blunt-nosed leopard lizard capture and relocation between 15 April and 1 July. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no direct effect of this action on SJKF, GKR, TKR or for the other species in the project areas, with the following exceptions: blading along the Firebaugh wasteway, Newman wasteway, and San Luis Drain may affect the GGS during spring and fall, when GGS move between aquatic and upland sites when leaving or seeking hibernacula. Damage or destruction of burrows in road shoulders may impact BNLL, CTS and CRLF. Individuals in burrows also may be struck by heavy equipment. Reduced burrows may affect prey availability to SJKF. SJWT are annual plants that may colonize disturbed grassland habitats, such as along rights of way. Colonizing plants would be harmed when these sites are sprayed.</p> <p>CH: No effect to the vernal pool species, as roads do not meet the PCE's. WNM the CH, as the activity does not preclude dispersal except briefly during the activity.</p>

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<p>4. <b>Canal Bank Revegetation.</b> Revegetation with native non-weedy plants is conducted to stabilize slopes and prevent erosion, retain support of the canal, exclude weeds and also provide wildlife habitat. The action is conducted periodically along the FK-Canal, including for experimental purposes after disturbance such as wildfires. Prior to revegetation, plots are scarified either by a gradall, loader, or klodbuster if they are on slopes, or by a disk if they on level terrain. Large flat plots are drilled, and hilly terrain is hydro-seeded. Small (approximately 30' x 60') test plots are hand broadcast. Plots may be mulched with straw, which may be tackified with wood fiber and a mulch tackifier to hold it in place. Heavy equipment used for seedbed preparation may harm soil dwelling animals, disturb burrows and has the potential to harm plants.</p>	<p>CTS, SJKF, TKR  CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use; Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area; conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG kit fox survey protocols, searches for Kit Fox dens and searches for burrows of small mammals, including those of listed kangaroo rats.</p>	<p>Follow O&amp;M Guidelines avoidance measures; follow the IPM Plans; follow guidelines for soil disturbance that may affect kangaroo rats, and SJKF. For SJKF, a search to locate animal burrows occurring in rights of way within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Spoil piles should be located away from areas with burrows that could provide habitat to listed species. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG, and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on SJKF, TKR in the action areas. Seedbed preparation for revegetation may indirectly affect CTS by destroying or damaging burrow sites.  CH: There will be no effect to critical habitat, as the FK in CTS habitat is concrete lined, and the canal itself is not vernal pool species habitat.</p>

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<p>5. <b>Canal/Tunnel/Conduit Liner Repair.</b> Liners, tunnels, and conduits are typically constructed of reinforced concrete. Cracked or broken liner panels, damaged sections on canals, or areas on wasteways and the aprons or outlets from canals are patched with concrete, grout compound, shotcrete, or other similar material that is pumped, blown or fed from a mixer by gravity. Damaged liner that cannot be repaired is overlaid with shotcrete or removed with heavy equipment and a new panel is fashioned in place. When panels are removed, the soil behind the panel may be excavated and then re-compacted; re-bar is installed before concrete is poured in place. Repairs usually are made when facilities are dewatered or water delivery is minimal, often in the fall and winter. However, repairs may be conducted from winter through the end of March on the CC Canal. Repairs are made along the lined lengths of the FK-Canal (about 125 miles), the CC-Canal (about 35 miles), Madera Canal (7 miles) DM-Canal (about 100 miles) San Luis Canal (about 103 miles), the Columbia Ridge Ditch Delivery Canal (about 1 mile), on wasteways or aprons for them (about 6 miles total) along the CC-Canal, DM-Canal, and FK-Canal. For conduit and tunnel repair on the Pacheco Tunnel/Conduit and Santa Clara Conduit/Tunnel, only minor patches are made after excavation at sites displaying seepage. Full dewatering of tunnels/conduits/pipelines in the San Felipe Project is considered major non-routine maintenance and is reviewed for environmental effects in separate environmental documentation. Space between soil and cracked panels may be exploited by CTS, GGS or other animal. Heavy equipment used to remove panels and compact soil, or labor to build forms causes soil disturbance could lead to inadvertent take.</p>	<p>CTS, CRLF, GGS, SJKF  CH: CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols and searches for kit fox dens.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow guidelines for soil disturbance that may affect GGS and SJKF. Where GGS is present, conduct activity during the snakes active period (May – October). For SJKF, a search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on SJKF in the project areas. Repair of panels is a soil disturbance and may affect CTS, CRLF and GGS aestivating behind liners.  CH: There will be no effect to critical habitat, as the lined portions of the canal do not meet the PCE's.</p>

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<p>6. <b>Chain Dragging Interior.</b> Chaining removes vegetation that can reduce conveyance, disrupt water delivery, or contribute to weed seed loads in canals or drains. A heavy chain with a cutting plate pulled between two vehicles traveling roadways along each side of the canal. The interior bank of canals and drains, or the canal prism itself, are chained to remove vegetation in unlined earthen sections, or lined sections where sufficient silt has collected to support growth of aquatic plants. Plants rooted in the bottom and tubers are uprooted and float to diversion points where they are collected with a scoop. Chaining is conducted about three times a year over 11 miles of the Coalinga Canal. Chaining is done once annually on both sides of 58 miles of the SL Drain to remove vegetation on the inside bank. The chained section of the SL Drain is dry, except for seepage through cracks in the liner. The ground along canals and drains is disturbed and animals may be disturbed or harmed by tow vehicles and the chain that passes over them.</p>	<p>BNLL, SJKF  CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG kit fox survey protocols, and searches for kit fox dens.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow guidelines for soil disturbance that may affect BNLL and SJKF. Where GGS is present, conduct activity during the snakes active period (May – October). A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Initial ground-disturbing activities in areas where BNLL are present will be scheduled to allow for blunt-nosed leopard lizard capture and relocation between 15 April and 1 July. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on SJKF in the project areas. BNLL along the Coalinga Canal could be harmed by equipment or chains and the burrows they use may be damaged or destroyed.</p> <p>CH: There is no critical habitat in the area of this action.</p>

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<p>7. <b>Chain Dragging Outside Bank Vegetation.</b> Chain dragging is conducted to remove terrestrial vegetation from the outer banks of canals. A heavy chain is towed between two vehicles on four or five occasions a year along about an 11 mile section of the Coalinga Canal and a 1.6 mile section at the inlet to PVPP. Dragging crushes or uproots plants and severs tumbleweeds at their base. Soil is disturbed and equipment towing chains disturbs and may harm species present on the outer banks of canals.</p>	<p>BNLL, SJKF  CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for Kit Fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, follow USFWS Plant Survey Guidelines, or looking for elderberry plants.</p>	<p>Follow O&amp;M Guidelines; Follow the IPM Plans; Follow guidelines for soil disturbance that may affect BNLL and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. In areas where BNLL is present, the action should be conducted during warm weather to allow this species to move away from the disturbance. Initial ground-disturbing activities in areas where leopard lizards are present will be scheduled to allow for blunt-nosed leopard lizard capture and relocation between 15 April and 1 July. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on SJKF in the project areas. Surface disturbance may adversely affect BNLL along the Coalinga Canal by damaging or destroying dens or harming individuals. Additionally, SJWT are annual plants that may colonize disturbed grassland habitats, such as along rights of way. Colonizing plants would be harmed during chaining at these sites.</p> <p>CH: There is no critical habitat in the area of this action.</p>

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<p>8 <b>Contact Herbicide Applications.</b> Contact herbicides are applied to control vegetation on canal banks, on rights of way, around water intakes and other structures, and at facilities compounds. Herbicides approved for use in California by the U.S. Environmental Protection Agency and the California Department of Pesticide Regulation are applied to check growth of vegetation that could threaten the integrity of facilities or foul its operation, maintain access to facilities and enable facilities inspections, reduce fire hazards, and to reduce the spread of noxious or invasive weeds. Additionally, contact herbicides are sprayed to reduce or eliminate habitat for pests, enhance security surveillance and provide for a well kept appearance at facilities. Herbicides are delivered from pressurized tanks and sprayed from vehicle mounted booms, via backpack sprayers or other application rig, bean gun, wand, or by manually wicking herbicides directly onto vegetation; aerial applications are required rarely. Applications are made following instructions on the label and are timed to occur when weeds are most susceptible, usually when plants are young or are actively growing (commonly from February through October), although this depends on the mode of action of the herbicide and plant phenology. One or more applications are made annually as needed, depending on weed pressure and need for control. A typical regimen for weed control includes pre-emergent applications for control of winter annuals, followed by one to several applications of contact herbicides for control of other annuals, which may be integrated with mechanical controls. Applications are made along the 37 mile length of the CC Canal, as well as around Contra Loma and Martinez reservoirs, along ditch banks at Volta Wildlife Area, along the ridge ditch delivery channel, along canal embankments and rights of ways along the FK-Canal from mile post 0.48-151.81, along inside banks of the Madera Canal's 36 mile length and on the rights of way, along the right of way from Pacheco Pumping Plant sub-station to Coyote Pumping Plant, on about 32 acres at the pumping station up to twice annually, at San Justo Reservoir, along both banks of the DM-Canal over approximately 111 miles, along both banks of approximately 58 miles of the SL-Drain (between milepost 105.72 and 163.46), at the Tracy Fish Facility, and at the Fish Release sites on the Delta. Applications are also made to the toe of Friant Dam and within the Friant Dam Compound. Spray rigs and herbicides disturb animal species in areas being treated. Herbicides may be toxic to listed organisms or their prey when contacted in the environment. Herbicides also may indirectly affect listed species by altering plant abundance, species composition, and the structure and extent of vegetative cover, thereby potentially altering the suitability of the habitat for particular listed species and/or their prey. Indirect effects also may occur from runoff effects on non-target organisms, including prey. Herbicides contacting ephemeral annual plants (e.g. SJWT) in rights of way may result in take.</p>	<p>BNLL, CTS, CRLF, GGS, GKR, SJKF, VELB, VPFS, Plants (SJWT)  CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, follow USFWS Plant Survey Guidelines, or looking for elderberry plants.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow the California Department of Pesticide Regulation County Recommendations for Pesticide Applications. Obtain written recommendation for pesticide application. Obtain approvals for pesticide application. In areas with BNLL, CTS, GGS, and CRLF avoid spraying in early morning hours if possible to reduce chance of encountering these species. Reduce the chance for non-target impacts by not applying herbicides when precipitation would cause runoff during the active period aquatic species. Erect tape or other barricades, if needed, to avoid treating protected elderberry plants. Follow avoidance measures for VELB. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there are no direct effects of this action on SJKF, VELB, and plants in the project areas. Listed plants are generally not found in disturbed areas to which herbicides are applied and would therefore not be harmed. VELB may be affected when proper procedures are not implemented. Contact herbicides applied to vegetation may be toxic when contacted by BNLL, CTS, GGS, CRLF and SJKF in sprayed terrestrial sites. Indirect effects to these species occur because of changes to the structure of habitat. Spraying reduces vegetative cover available to SJKF, CTS and CRLF. In contrast, reduction of cover along rights of ways within the range of BNLL may be favorable. Indirectly, changes in prey species availability and/or abundance may impact predators such as SJKF. Species such as VPFS may be harmed by herbicide runoff into adjacent ditches and drains. SJWT are annual plants that may colonize disturbed grassland habitats, such as along rights of way. Colonizing plants would be harmed when these sites are sprayed.</p> <p>Critical Habitat: The insignificant amount of cover that will be reduced (PCE 3 for CTS) does not meet the threshold for adverse modification of critical habitat. The avoidance measures will prevent adverse modification to the ability of vernal pools to support the listed vernal pool species.</p>



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<p>9. <b>Copper Sulfate Applications.</b> Applications are made to the FK-Canal and the Madera Canal via the slug method. Copper sulfate is added at predetermined locations to increase the acidity in the canal sufficiently to kill algae. Copper sulfate is dumped in at the head of the canal and acidity is measured downstream. When acidity drops below an efficacious level, additional copper sulfate is added at subsequent locations. Control is conducted when algal blooms begin, commonly from May through October. Applications are made on a monthly or slightly more frequent basis; when needed applications are made on a 10-14 day cycle in response to rapid algal growth during warm weather. Over time, there may be an increase in copper in sediments in the canal, but this material likely becomes chelated.</p>	<p>CTS CH: CTS</p>	<p>Review LSM for species descriptions, their distributions and habitat use; Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow plans submitted for NPDES permits.</p>	<p>With implementation of the described avoidance /minimization there are no effects of this action on CTS. CTS either do not inhabit the canal systems where applications are made, or they are unlikely to be active when treatments are made. Dilution of copper in water systems or chelation with sediments may limit adverse effects on CTS that might enter the canal.</p> <p>CH: The water in the canals is not critical habitat.</p>
<p>10. <b>Canal Dewatering.</b> Dewatering is done to facilitate maintenance of canal facilities, including repair or replacement of liner or inspecting or repairing siphons. During the process, water to one or more sections of the canal is "cut off." In some cases, water may be pumped "upstream" behind a check or control structure. On the DM-Canal, dewatering is also done to enable inspection of the Mendota dam every 2 or 3 years. Dewatering is also done on the Pacheco Conduit and Tunnel, and on the Santa Clara Conduit and Tunnel. Conduit/Tunnel dewatering is a major action dealt with in a separate environmental review. The CC-Canal, DM-Canal, San Luis Drain, FK-Canal, Madera Canal, and Columbia ridge ditch, or segments thereof, are dewatered. The action is conducted when demand for canal use is lowest (usually October through March). Wet depressions in canals may be attractive to CTS, GGS and also to their predators. When reflooding occurs, individuals could be trapped or displaced from suitable habitat.</p>	<p>GGs, CTS CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans. In areas with GGS dewater canals after the GGS have entered hibernacula in order to prevent inundation of hibernacula upon canal reflooding.</p>	<p>Canals are not generally inhabited by listed species and there is no effect from this action in most locations. Aquatic or semi-aquatic species (i.e., GGS) would not be present in aquatic habitats when dewatering is conducted. However, when the DM-Canal is dewatered for inspection of Mendota dam, water is diverted down Firebaugh Wasteway. With the rise in water levels along the Firebaugh Wasteway, hibernacula that GGS may have already entered could be inundated. Dewatered FK-Canal and Madera Canal may provide habitat attractive to CTS; when reflooded may trap CTS or displace them from areas with suitable habitat.</p> <p>CH: The water in the canals is not critical habitat.</p>

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<p>11. <b>Drainditch and Channel Maintenance.</b> This maintenance is conducted to ensure conveyance of water through facilities or away from facilities. Surface (e.g. ditches, flumes, and overchutes) and subsurface (e.g. downdrains, pipes, and underchutes) drains, as well as the main channels of canals are maintained. Maintenance includes cleaning debris, trash, soil, sediment, and vegetation from open ditches or canals, reshaping them with heavy equipment if necessary. Debris and vegetation that periodically accumulates in collecting basins or pipe is removed by hand or with a shovel. If piping is cracked, soil may be excavated and piping replaced. Backhoes, gradalls, excavators, dredges, draglines, tractors, and hand shovels may be used to remove material in surface areas. Cleared soil and vegetation may be piled on adjacent land or, when extensive, may be transported in trucks to a spoil site. Drainditch and channel maintenance are conducted annually where needed along the CC-Canal, San Luis Canal, the DM-Canal, the SLD, the FK-Canal, and on the Madera Canal. Activities occur primarily in fall and spring, but are concentrated during the end of the dry season (especially August to October) and before fall rains begin. Soil on ditch banks and soil and vegetation, possibly including elderberry plants, that occurs along banks and in depressions is disturbed or removed. In the process, burrows harboring listed species or their prey may be disturbed or destroyed, along with potential for CRLF, CTS, GGS and VPFS.</p>	<p>CTS, CRLF, GGS, SJKF, VELB, VPFS</p> <p>CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, or looking for elderberry plants.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans. Conduct surveys for listed species. Follow guidelines for soil disturbance that may affect GGS and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Clearing of vegetation from ditches and drains should be conducted during dry periods when possible, to minimize chance for harm to aquatic species (e.g. CTS, CRLF, GGS). Flag or erect barricades around protected elderberry plants to avoid take. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no residual effect of this action on SJKF in the project areas. The removal of vegetation from ditches removes habitat that may be used seasonally by listed species; notably by CRLF and GGS along the DM-C and SL-Drain; by CRLF, CTS and GGS along the CC-Canal, by CRLF along the San Luis Canal, and by CTS along the FK-Canal and Madera Canal. Additionally, removal of soil and vegetation from earthlined lateral drainditches along the FK-Canal and the Madera Canal potentially destroys eggs from VPFS. Elderberry plants may colonize ditch banks, but continuous disturbance may prevent plants from developing to sizes preferred by VELB for utilization (i.e. approximately &gt; 1 inch in diameter). Removal of elderberry plants may occur during clearing drainage channels.</p> <p>CH: WNM – the moving water in the drainditches does not constitute critical habitat for CTS or vernal pool species.</p>

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<p>12. <b>Grazing.</b> Grazing reduces vegetative cover and may alter the plant species composition of a habitat. Grazing animals can trample or consume listed species, although the impacts are not likely entirely detrimental to listed species. Grazing appears to help reduce competition from exotic plant species that have come to dominate the current landscape, providing benefit to listed plants, as well as animals that are adapted to grazed grassland environments. Historically, lands along the DM-Canal near the TPP were grazed during the winter and spring, although there are no active grazing leases at this site at this time. Overgrazing or lack of grazing may affect listed species.</p>	<p>CTS, SJKF, Plants (Vernal pool plants)  CH: Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, follow USFWS Plant Survey Guidelines, or looking for elderberry plants.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans. Use appropriate stocking rates to maintain existing conditions that are proven supportive of extant listed species.</p>	<p>With implementation of the described avoidance /minimization there is no apparent effect of this action on listed species or their habitats. However, loss of grazing activity could threaten the persistence of listed plant species if these species are dependent on grazing for removal of competing species.  CH: WNM – The activity will have no effect on the PCE's for the critical habitat, and may provide a slight benefit, by reducing the amount of non-native vegetation in the area.</p>
<p>13. <b>Hand Control of Vegetation.</b> Hand control is used to remove small amounts of nuisance or weedy vegetation at facilities or around structures where use of equipment or herbicides is impractical, such as where the extent of the problem is small. Hand control of vegetation is conducted year-round on virtually all lands and around all facilities, including rights of way, fenced sites enclosing facilities, around water control structures, buildings, and at other facilities maintained by CCWD, CRCD, FWUA, MCWPA, SLDMWA and WWD. Removal is done by hand pulling vegetation, or removing it with aid of stringed weed cutters, spades, hoes, shovels, adzes, saws or other hand implements. Disturbance occurs from cutting and removal of vegetation. The limited extent and types of plants removed do not generally provide habitat for listed species. Removal of woody plants during winter when they are defoliated may inadvertently result in take of elderberry plants by inexperienced workers or those unfamiliar with the distribution of elderberry plants on project areas.</p>	<p>Plants (elderberry)  CH: CRLF, CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species, such as elderberry plants.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow avoidance measures for VELB. If possible, restrict removal woody vegetation in riparian areas to times when plants have foliage to preclude accidental take of elderberry. Flag or erect barricades around elderberry plants during the growing season when foliage is present to help avoid take.</p>	<p>Listed plants are not generally found on highly disturbed project areas where manual control is conducted. With implementation of described avoidance /minimization Elderberry Bushes can be protected and there is no effect of this action on VELB.  CH: No critical habitat will be affected by this action.</p>

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<p>14. <b>Insecticidal Sprays.</b> Arthropod pests can present a human health hazard for people allergic to stings or bites. Pesticides registered for use in California by the U.S. Environmental Protection Agency and the California Department of Pesticide Regulation are applied to control bees, wasps, spiders, ants, cockroaches, fleas, termites, mosquitoes and other arthropods. Insecticides are applied year-round, as needed, but primarily from spring through fall, according to the product label. They are applied in and around recorder houses, at remote sensing SCADA stations, at inspection stations and other structures along conveyance facilities and appurtenant structures. Materials applied vary, but often those with quick knock-down are dispensed directly from canisters. These may be applied by applicators or hired structural pest control specialists. Material applied at recorder houses, vaults, and out-buildings before precipitation events could lead to pesticide runoff. Listed species do not typically occupy these habitats and would not be affected by applications. However, at recording stations in the field, there is limited potential for listed species to contact pesticides.</p>	<p>CTS, CRLF, GGS, VELB  CH: VPFS</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species, including elderberry plants, that could be affected.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow the California Department of Pesticide Regulation County Recommendations for Pesticide Applications. Obtain written recommendation for pesticide application. Obtain approvals for pesticide application. Do not apply outside structures when precipitation could cause runoff. Follow avoidance measures in the O&amp;M Guidelines for VELB. No pesticides that might harm VELB or its host plant will be used within 100 feet of any elderberry plant with a stem measuring 1.0 inch or greater in diameter at ground level. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species or critical habitat. Structures are not habitat for listed species. However, the O&amp;M Plan should be updated to advise application of materials to facilities that are not indoors only when risk of pesticide runoff into watercourses is minimal (i.e. when threat for precipitation is minimal).  CH: The action does not occur in the vicinity of critical habitat, and so will not have an effect.</p>
<p>15. <b>Mudjacking and/or Injecting Grout.</b> Grout or fill (liquefied clay) is used to fill cracks in the canal liner and voids behind the liner. When leaks appear on the outside of the prism of the canal, or are associated with liner voids or cracks, holes are bored behind the liner with an auger and grout or fill is gravity fed from a mixer through tubes or hole borings into the void. When no additional material is accepted into borings and leakage stops, the leak is assumed to be patched and additional borings are unnecessary. The grout or fill restores physical support to the canal, which otherwise could fail due to the force on the liner from water inside the canal. Failure could result in a "blowout" that would flood surrounding land. Mudjacking/Injecting Grout is conducted along the San Luis Canal, CC-Canal, Coalinga Canal, Columbia Ridge Ditch, FK-Canal, Madera Canal, the DM-Canal and appurtenant wasteways. Repairs are conducted when defects are discovered, with work preferentially conducted during dewatering. Filling voids eliminates resting sites or those that can be used by aestivating CTS and GGS.</p>	<p>CTS, CRLF, GGS  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is still risk for take for a variety of species that utilize subterranean sites. Voids and erosion spots provide easy access behind liners of the canal to species seeking refuge in subterranean sites. They also provide a unique microenvironment that is likely to be moist and cool, compared to surrounding soil and the surface. These sites may be used as hibernacula for CTS and GGS, and as resting areas for CRLF. CTS, CRLF, and GGS are not likely to be detected at the sites. Consequently, filling voids is expected to result in take of these species along the San Luis Canal, CC-Canal, DM-Canal, and Madera Canal. There is need for a technique to determine burrow or niche occupancy.  CH: No Effect – Concrete canal linings do not constitute any of the PCE's.</p>

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<p>16. <b>Pre-emergent Herbicide Applications.</b> These applications are made as part of weed control programs that deal with nearly year-round weed problems that exist in much of the San Joaquin CVP project area. Where weeds are not tolerated, such as on the inner prism of canal banks adjacent to the liner, weed germination is suppressed with pre-emergent herbicides to limit the spread of noxious or invasive weeds, reduce habitat for pests, help maintain access to facilities and enable inspections, check growth that could threaten facility integrity, limit fuel load and reduce fire hazards, and to provide for a well kept appearance of facilities. Like contact herbicides, pre-emergent herbicides are applied around water intakes, on canal banks (particularly inner banks), on rights of way, around structures, and at facilities compounds. Applications are made along the CC-Canal, San Luis Canal, FK-Canal, Madera Canal, the Pacheco Conduit/Tunnel, and Santa Clara Conduit/Tunnel to Coyote Pumping Plant. Applications are made following the herbicide label instructions and are timed to occur when weeds are most susceptible. Unlike contact herbicides which are applied directly to foliage, preemergents are applied to soil before seeds germinate, usually once annually in fall or early winter. Applications are made from pressurized spray tanks with a vehicle mounted boom sprayer, a backpack sprayer, or for granular formulations, with spreaders. Herbicides reduce vegetative cover that may be used by listed species or their prey. Herbicides exhibit varying levels of toxicity to animals, and when transported in runoff, they may contaminate animals using ditches adjacent to project areas.</p>	<p>BNLL, CTS, CRLF, GGS, GKR, SJKF, TKR, Plants (Elderberry Plants)  CH: CTS, CRLF</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, follow USFWS Plant Survey Guidelines.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow the California Department of Pesticide Regulation County Recommendations for Pesticide Applications. Obtain written recommendation for pesticide application. Obtain approvals for pesticide application. Apply per label, and when precipitation would not result in runoff and transport of material away from target areas. No pesticides will be used that may harm VELB or elderberry plants within 100 feet of any plant with a stem diameter 1.0 inch or greater in diameter. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is limited risk of take for plants, with the exception of SJWT which may colonize disturbed grassland habitat that could be found along rights of way. Other listed plants are not expected to occur on the highly disturbed areas where pre-emergent herbicides are applied. There is chance for exposure to toxins for CTS, CRLF, GGS, BNLL, GKR, SJKF and TKR, when these animals traverse treated habitat. Pre-emergent herbicides reduce vegetative cover for listed species and may affect prey species abundance and distribution. Some species may be negatively affected, whereas others may benefit from such conditions, depending on the vegetation at the site.</p> <p>CH: WNM – The amount of vegetative cover that meets the PCE standard that will be reduced is insignificant and does not meet the threshold for adverse modification.</p>

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<p>17. <b>Prescribed Burning for Weed Control.</b> Burning is conducted to control weedy vegetation while minimizing use of herbicides and the need for mechanical control (e.g. discing or chaining). Graders, dozers, water tankers, and pumper trucks may be used to provide suppression. Fire breaks may be created by scraping soil of vegetation with graders or other heavy equipment to provide containment. Drip torches may be used to initiate burns. Because of local permitting requirements for air quality, and Reclamation policy discouraging burning surface areas over one acre, fires are made over limited areas where containment can be ensured. Areas burned include levee banks along the San Luis Canal, Coalinga Canal, FK-Canal, and DM-Canal. Burning may be accomplished between 1 October and 1 March, when legally permitted. Open burning between 1 March and 31 July requires a biological survey for potential impacts to migratory birds. An approved burn plan is required from Reclamation before burns can be initiated. Burns remove vegetative cover, potentially altering suitability of sites for listed species and their prey. Escaped burns may endanger plants that may grow near canals, including elderberry plants, Hartweg's golden sunburst (HGSB) and SJWT.</p>	<p>BNLL, CTS, GKR, SJKF, TKR, Plants (HGSB, SJWT)  CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, follow USFWS Plant Survey Guidelines.</p>	<p>Follow O&amp;M Guidelines, including those required for burning; follow the IPM Plans. Preclude burning where known listed plant populations exist on adjacent lands. Preclude burning in areas where listed plants are known to exist. Obtain approval of burn plans from Reclamation. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance/minimization, listed plants would not be affected. Fire might have an effect on CTS inhabiting burrows. Removal of vegetation may benefit BNLL by providing more open substrate and may have an unknown effect on SJKF. The O&amp;M Plan should be updated to require a search to locate kit fox burrows occurring within proposed burn areas. Additionally, a protected no burn buffer around active burrows should be established with advice from Service before undertaking this activity. Indirect effects on SJKF may occur because of changes in prey abundance and distribution in burned areas falling within a home range. Burns of limited scope reduce risk of escape and potential inadvertent take  CH: The small size of the burns and the preclusion of burning near identified populations of listed species will have no effect on the critical habitat.</p>
<p>18. <b>Right of Way Dust Abatement.</b> Dust abatement is conducted to minimize fugitive dust where the unpaved (non-operational) roadway or outer canal bank is graded and where construction is occurring or spoils soil is being hauled during work operations at facilities. Typically, a water truck traverses the roadway or work area and sprays water directly onto the soil surface during single or multiple passes. Flooding also may be used to limit dust. Vehicular traffic for dust abatement may temporarily disturb SJKF.</p>	<p>SJKF  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols and searches for kit fox dens.</p>	<p>Follow O&amp;M Guidelines. Adhere to speed limits on rights of way.</p>	<p>With implementation of the described avoidance/minimization measures there would be only temporary disturbance of SJKF.  CH: Critical habitat will not be affected by this action.</p>

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19 <b>Right-of-Way Mowing.</b> Mowing is conducted with a rotary, sickle bar, or other mower blade attached to a tractor. Mowing is conducted primarily in spring to control weeds and reduce eliminate the need for herbicide applications along areas of the CC-Canal and adjacent rights of way, along the Columbia ridge ditch, along the FK-Canal, and around the dam and dike at San Justo Reservoir. Mowing equipment disturbs sites and reduces vegetative cover used by listed species or their prey. Mowers may be a direct source of mortality.	GGS, CRLF, CTS, SJKF, Plants SJWT  CH: CTS, CRLF	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, and following USFWS Plant Survey Guidelines.	Follow O&M Guidelines; follow the IPM Plans. The O&M Plan should be updated to identify avoidance measures when mowing including: 1) when mowing near streams or canals, work should start on the side furthest from the water to steer the snakes toward the water, and where feasible, cover should be maintained next to canals by mowing opposite banks in alternate years in order to provide cover for GGS, CRLF and CTS; and 2) height of the mower blades should be set as high above the soil as possible. In areas where CRLF and CTS may be present, if possible, mowing should be done during periods when they are not moving overground (May – October). Mowing done during winter and spring (November - May) should be conducted when conditions are dry and during mid-day, when these species are less likely to be moving about aboveground.	With implementation of the described avoidance /minimization there is no effect of this action on listed species with the following exception: highly disturbed areas that are mowed are not habitat for listed plants and there is no effect of this action on them, with the exception of SJWT. Mowing may be a direct source of mortality for CRLF, CTS, BNLL, and GGS that occur on levee banks or rights of way.  CH: WNM – The activity does not eliminate the available cover, only reduces its height.
20 <b>Rip Rap.</b> Rip rap is comprised of large rocks and boulders of varying sizes that are placed at dams, spillways and canal or levee banks, especially near bridges and canal undercrossings, or water control structures, to prevent erosion of shorelines or embankments, and to strengthen the channel. The work is conducted when needed to protect banks, but it is preferentially performed during the dry season. Rock is delivered to the site by truck and trailer; dumped rock is piled with the aid of backhoes and excavators along the CC-Canal, FK-Canal, Madera Canal, DM-Canal, and Coalinga Canal. Heavy equipment is a temporary disturbance and burrows may be permanently covered. Niches in riprap can be occupied by small animals, and although larger animals can shelter in the rip rap, there is usually sufficient rock layer underneath that they cannot easily burrow in the soil underneath.	GGS, SJKF  CH: CTS, CRLF	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols and searches for kit fox dens.	Follow O&M Guidelines. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.	With implementation of the described avoidance /minimization there is no effect on SJKF. GGS may benefit by additional niches created in new rip-rap, but O&M Plans should be updated to recommend that in areas where GGS snake may be exploiting in rip-rap, such material should be placed in the summer, and at mid-day, when snakes are active, in aquatic habitats, and not likely to be at sites being rip-rapped.  CH: WNM – There may be a slight beneficial effect, as the rip-rap provides cover for small-sized animals to shelter among the rocks.

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<p>21 <b>Roadway Chipseal.</b> Chipseal is applied on the operational side of canals to maintain an all weather surface that maintains access to the facilities. Sections of roadway (up to 10 miles) are annually repaired in sequence. The road surface is swept free of loose rocks and debris and cracks or holes in the surface are manually patched with asphalt. An asphalt and water mixture is sprayed on the prepared road surface and immediately afterward a layer of small crushed chips of gravel is applied and rolled in by vehicles. Chipsealing is accomplished primarily in summer to early fall along the San Luis Canal, Friant Kern - Canal, Pacheco Pumping Plant entrance, and at roads adjacent to Coalinga Canal. Roadwork may disturb SJKF temporarily; BNLL contacting asphalted surfaces may be soiled.</p>	<p>BNLL, SJKF  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols and searches for kit fox dens.</p>	<p>Follow O&amp;M Guidelines. Maintain trash free work area. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>Roadway surfaces don't provide habitat for listed species. With implementation of avoidance/minimization SJKF would not be affected other than possibly by temporary disturbance. There is limited chance that BNLL may cross roadways being prepared for chipsealing and become soiled.  CH: There will be no effect to critical habitat from this activity, as roads are not critical habitat.</p>
<p>22 <b>Squirrel Baiting.</b> Rodenticides are applied to control ground squirrels that burrow into embankments, canal levees, at earthen fill dams, around buildings, at pumping stations and other facilities on canals or waterways. Burrowing is a nuisance, creates hazards, and can undermine the integrity of roadways and structures, by creating voids that weaken the integrity of conveyance structures or that lead to "piping" (water leakage). Toxic grain baits are made available by broadcast or in bait stations along the CC-Canal and at the Contra Loma Dam, around the Columbia Main Pumping Plant and Mowry Pumping Plant, the Friant Kern Canal, Madera Canal, at San Justo Dam and Dike, the DM- Canal, and along the Coalinga Canal and Pleasant Valley Pumping Plant. Within the range of SJKF and listed kangaroo rats, CDFR approved bait dispensers that preclude access by these species are used. When not in use, traps are closed or bait removed. Some pelleted products are legal to use by broadcast method within the range of the SJKF and pelleted anti-coagulant rodenticides may be harmful if fed upon. Small grain baits may be eaten directly or they may be an attractant to insects, which when fed upon could result in accidental consumption of poison bait. Indirect effects from baiting are reduction in abundance of mammal burrows available to BNLL, CTS, CRLF, GGS or even SJKF, where these species ranges overlap. Additionally, there is a reduction of potential prey for SJKF.</p>	<p>BNLL, CTS, CRLF, SJKF, GGS  CH: CTS</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, and searches for burrows of small mammals, including those of listed kangaroo rats.</p>	<p>Follow O&amp;M Guidelines; follow the IPM Plans; follow the California Department of Pesticide Regulation County Recommendations for Pesticide Applications. Obtain written recommendation for pesticide application. Obtain approvals for pesticide application. Minimize spillage from bait stations by not overfilling stations and re-supplying more frequently. Reduce accidental poisoning of non-target species through use of specially designed bait stations. Frequent checks for carcasses, and proper disposal of carcasses. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there are still effects on listed species. While there is minimal risk that bait could be consumed by non-target species, spillage from above ground stations could slightly increase risk to non-target species such as SJKF, GKR and TKR. Secondary poisoning through consumption of insects that may have consumed bait is possible. Indirect effects from control of squirrel populations include reduced prey for SJKF and reduced burrow habitat for BNLL, CTS, CRLF and GGS.  CH: WNM – A reduction in the amount of small mammals, and therefore small mammal burrows, will not significantly affect the suitability of the area for dispersal (PCE 3).</p>



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<p>23 <b>Bargate / Fence Installations.</b> Gate and fence installations and repairs are made to limit access to facilities, to provide security and where safety or the protection of resources is a concern or encroachment is a problem. Barbed-wire fencing is strung at perimeters of Reclamation rights-of-way. Chain link fence is installed where the public has access to facilities and it is necessary to protect public health and safety, or where it is necessary to protect the canal or facilities from dumping or vandalism. Bargates are installed where canal rights of way intersect public roadways, such as at corners of bridges, on secondary and primary roads, and on parallel fences at or near structures. Holes for support structures for fencing are dug by hand implements, power auger, or backhoes. Holes for bargates are dug with power augers or a backhoe. Barbed wire is attached to steel t-posts that are driven with a post driver; wooden braces and corners may be set as anchors if the fence is constructed around uneven terrain. Pipe rods are set in the ground with concrete to which chain link fencing is attached. Installations or repairs are made as needed along the CC - Canal, Columbia Main Pumping Plant, Mowry Pumping Plant, FK- Canal, Madera Canal, DM-Canal and SL-Drain. Gates are cleaned and painted. Setting posts disturbs soil along canals and rights of way and may damage or destroy burrows.</p>	<p>CTS, SJKF, TKR  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use; Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species; Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area; Consult surveys for presence of listed species in the action area; If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG Kit Fox survey protocols, searches for Kit Fox dens, searches for burrows of small mammals, including those of listed Kangaroo Rats.</p>	<p>Follow O&amp;M Guidelines; follow guidelines for soil disturbance that may affect kangaroo rats and SJKF. For SJKF, a search to locate animal burrows occurring in rights of ways within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. Cover or use barriers for holes &gt;2 feet deep that are left open overnight. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Spoil piles should be located away from areas with burrows that could provide habitat to listed species. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>Avoidance measures for earth disturbing activities minimize the likelihood that SJKF and TKR would be harmed by this action. The likelihood is small that CTS exist in burrows in the pathway of fencing project, though they likely would not be discovered and could be harmed by digging required to set gates.  CH: This activity will not affect any critical habitat.</p>
<p>24 <b>Bridge Maintenance (running pad replacement).</b> Wooden running pads are replaced on bridges over the CC-Canal, FK-Canal, Madera Canal, and DM-Canal. Pads are unbolted from the deck, lifted off with a crane or hoist and replaced with new pads. Bridge surfaces, including railings, are pressure washed with water, and when necessary painted with brush or roller by hand. Support pillars that have rotted or been damaged additionally are removed with crane or hoist and replaced with new pillars that are driven into place. Concrete decking may replace wooden decking. Support pillars are prepared with re-bar and concrete is poured in place in forms. Steel cross beam underdecking is lowered onto pillars and prefabricated concrete pads are lowered onto the cross beams using a crane. Maintenance is usually conducted in the spring or fall. Heavy equipment and workers cause disturbance on the adjacent roadway and at the bridge.</p>	<p>None  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use; Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.</p>	<p>Follow O&amp;M Guidelines. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species or their habitats.  CH: No effect.</p>

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25 <b>Cableway Maintenance (painting/cleaning/repair).</b> Cables and pulleys are checked for wear, pulleys are lubricated and baskets are or painted with brushes. Contamination from could occur from painting and lubricating the facilities. Soil disturbance may be necessary when support structures must be re-anchored. Where cables enter structures, debris, and animal nesting material is removed.	None  CH: CTS, CRLF, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.	Follow O&M Guidelines; use Best Management Practices (BMP's) to prevent environmental contamination when applying paint and lubricants. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.	With implementation of the described avoidance /minimization there is no effect of this action on listed species or their habitats.  CH: No effect.
26 <b>Canal System Operator Residence Repair.</b> General maintenance to a residential facility such as painting, plumbing repair, landscape maintenance, road maintenance and structural pest control is conducted as needed. Residential sites are not suitable habitat for listed species and maintenance actions conducted here would not affect them	None  CH: None	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.	Follow O&M Guidelines. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.	Habitat for listed species does not occur at these sites. With implementation of described avoidance /minimization, there is no effect of this action on listed species or their habitats.  CH: No effect.

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<p>27. <b>Cattle Guard Rehabilitation.</b> Metal side support frames are pressure washed or brushed and painted, or replaced as necessary. Supports frames may be dug out by hand or with equipment such as a backhoe. When frames are installed, pilot holes may be dug by hand or with equipment such as augers and backhoes. Accumulated soil and debris that clogs vault outlet (culvert) drains is removed manually, with shovel, or with equipment such as a backhoe. Rehabilitation occurs along the CC-Canal, FK-Canal and Madera Canal. Soil is disturbed when the vault or side support frames must be removed. Additionally, the vault casing may act as a pitfall trap which could potentially divert CTS and CRLF from their intended paths, or subject them to harm when vaults are cleaned.</p>	<p>CTS, CRLF, SJKF  CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, and searches for burrows of small mammals, including those of listed kangaroo rats</p>	<p>Follow O&amp;M Guidelines; follow guidelines for soil disturbance that may affect SJKF. Vaults should be visually inspected for CTS and CRLF before being cleaned of debris. Conduct cleanouts during the dry period in summer or fall when CTS and CRLF would be less likely to be present. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Cover or use exclusion fencing around excavations that are left open overnight and are &gt;2 feet deep.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species or their habitats. However, the vault casing may act as a pitfall trap for CTS and CRLF, potentially diverting them their intended travel paths.  CH: No effect.</p>

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28. <b>Down drain Installation</b> – Water that ponds against the uphill side of a canal levee is drained away, either underneath the canal or into it. Soil is excavated with equipment such as a backhoe to lay drain pipe and to form a shallow basin that collects and funnels water into the concrete or metal drain pipe. Installations are made along the FK-Canal and the DM-Canal. Installations result in soil disturbance and loss or destruction of depressions that may provide habitat for VPFS and CTS. Burrows may be damaged or destroyed.	CTS, SJKF, TKR, VPFS  CH: CTS, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or looking for elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines; follow guidelines for soil disturbance that may affect kangaroo rats, and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Cover or use exclusion fencing around excavations that are left open overnight and are >2 feet deep. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. SCCAO will, if needed, visit the site and advise on approaches to help minimize impacts	With implementation of the described avoidance /minimization effects to listed species and critical habitat would not occur as a result of this action, except for the following: burrows of small mammals that may be used by TKR and CTS may be disturbed and destroyed during excavations and installation of downdrains. Additionally, any VPFS present in depressions, or CTS that may be aestivating in burrows along the canal or temporarily located in drains, could be harmed during excavations and maintenance.  CH: WNM – Water is removed before it becomes available for colonization by CTS or vernal pool species.

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<p>29) <b>Drainage Improvements (ditches or pipe).</b> Heavy equipment, including dozers, tractors, backhoes, longsticks, and graders etc. are used to excavate drainage trenches and install drain pipe or to fill low spots to improve drainage. Additionally, trenches and drains are cleared of vegetation and silt with heavy equipment or by hand. Excavated material is piled on levees or rights of way, or is transported by truck to an offsite location. Drainage improvements are made as needed, although mostly annually, along the CC - Canal, Columbia main delivery ditch, FK-Canal, Madera Canal, DM-Canal, and the inlet channel to PV-Pumping Plant and the Coalinga Canal. Work occurs preferentially during dry conditions, usually in the fall, before rains begin. Soil is disturbed and depressions that collect water are filled, reducing potential ephemeral habitat for VPFS, CRLF and CTS. Spoil mounds attractive to SJKF, TKR or other species may be created, only to later be removed. Earthwork can destroy burrows and result in mortality through vehicle strikes. It also may disturb sites that harbor listed species or are important habitat for their prey. Removal of accumulated vegetation, debris and soil from existing drains (downdrains, lateral drains, overchutes or underchutes, etc.) with heavy equipment or by hand may harm CRLF, CTS, GGS, VPFS.</p>	<p>CTS, CRLF, GGS, SJKF, TKR, VELB, VPFS</p> <p>CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or for elderberry plants (following USFWS Plant Survey Guidelines).</p>	<p>Follow O&amp;M Guidelines; follow Clean Water Act Nationwide or Sect 404 ACOE permits as applicable; follow guidelines for soil disturbance that may affect GGS, kangaroo rats, and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Spoil piles need to be examined and cleared free of listed species before soil is removed from them. Moist or wet drainage channels or areas where water ponds may be utilized by CTS, CRLF, and GGS. Drainage improvement at these sites should be avoided when these animal species are expected to be present (November to April for CTS; November to May for CRLF; and April through October for GGS). Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. If necessary, SCCAO will visit the site and advise on approaches to help minimize impacts.</p>	<p>After taking all avoidance measures and minimization steps, there is no effect of drainage improvements on SJKF. However, VPFS may be present in depression year round and they would be harmed by this action, regardless of the time of year the action was taken. Additionally, CTS, CRLF, and GGS may be affected through loss of aquatic habitats or injury from equipment used to clear drainages.</p> <p>CH: WNM – Areas of standing water, which might become PCE's, are removed as soon as they form, before they are colonized or become PCE's.</p>

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30. <b>Electrical Repairs by Utility Companies (PG&amp;E, SCE, or others).</b> Repairs are made at all utility serviced facilities, as needed, year-round, and primarily at buildings or facilities. Repairs to, or replacement of, transformers, power poles, and severed underground utility lines are made occasionally by utility line crews operating from service vehicles. Pole replacement and underground line repair requires soil excavation that can disturb or destroy burrows and potentially harm burrow occupants.	BNLL, CTS, CRLF, SJKF, TKR  CH: CTS, CRLF, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols and searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats.	Follow O&M Guidelines. Adhere to guidelines that cover soil disturbance for SJKF, BNLL and kangaroo rats. A search to locate animal burrows occurring within 200 feet of a proposed work site with soil excavation will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Cover or use exclusion fencing around excavations that are left open overnight and are >2 feet deep. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. SCCAO will, if necessary, visit the site and advise on approaches to help minimize impacts.	With implementation of the described avoidance /minimization there is no effect of this action on listed species or their habitats.  CH: No critical habitat will be affected by this activity,

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<p>31. <b>Embankment Maintenance (filling washes and gullies).</b> Fill embankments form the sides of canals where the canal is higher than the surrounding terrain. Protective and training embankments occur along the uphill side of a canal, the former function to reduce runoff and erosion of soil into the canal, and the latter divert water toward underdrains or overchutes. Backhoes, graders, excavators or hand implements are employed to fill gullies, burrows, compact soil and grade slopes as needed, but primarily during the dry season. Trucks are used to haul fill. Embankment maintenance is conducted along the CC-Canal, Columbia Diversion Channel, San Luis Canal, FK-Canal, Madera Canal, Pacheco Conduit/Tunnel and Santa Clara Conduit/Tunnel, DM-Canal, and Coalinga Canal and inlet at PV- Pumping Plant. This action disturbs soil and may damage or destroy burrows.</p>	<p>BNLL, CTS, TKR, SJKF  CH: CTS, CRLF</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats.</p>	<p>Follow O&amp;M Guidelines; follow guidelines for soil disturbance that may affect BNLL, kangaroo rats, and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. SCCAO will visit the site and advise on approaches to help minimize impacts if needed.</p>	<p>With implementation of the described avoidance /minimization, potential loss of burrow habitat and the listed species or prey that may inhabit them exists. BNLL, CTS and CRLF present in shallow burrows along rights of ways are subject to strikes from equipment. Indirect effects occur to listed species, including kangaroo rats, SJKF, BNLL, CTS, and CRLF when burrows of small mammals are damaged or destroyed by the action.  CH: WNM –The washes and gullies are repaired before they become available to CTS or CRLF.</p>
<p>32. <b>Facilities Inspection.</b> All project facilities are inspected once annually. Mechanical (gates, pumps, etc.) and electrical (communications, monitoring, and computer systems, etc.) equipment is visually examined and operated to test functioning. Conveyance and storage facilities (i.e. canals, dams, reservoirs) and other physical facilities are visually inspected for integrity. Mechanical testing of features such as radial gates, turnouts and pumping plants may temporarily disturb some listed aquatic species or the distribution of their prey.</p>	<p>GGS  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.</p>	<p>Follow O&amp;M Guidelines' avoidance measures. In areas where GGS is present, the actions which involve movement of water or mechanical operation of pumps or gates should be tested outside periods of GGS activity (May to October).</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species or their habitats.  CH: There will be no effect to critical habitat from this activity.</p>

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<p>33. <b>Graffiti Removal from Concrete Structures.</b> Graffiti is painted over by hand with a brush or roller, or is removed by sandblasting. Waste paint from sandblasting is collected and disposed of at an appropriate waste disposal site. Graffiti is controlled as needed on recorder houses, headworks and other structures at all project facilities in CCWD, CRCD, FWUA, MCWPA, SLDMWA and WWD. Sites with graffiti are disturbed when conducting the work, however these features do not provide habitat for listed species. Spillage or waste paint could contaminate sites.</p>	<p>GGS  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.</p>	<p>Follow O&amp;M Guidelines. Use BMP's for handling paints and solvents to eliminate environmental contamination.</p>	<p>With implementation of the described avoidance /minimization measures no effect to listed species or their habitats would be expected.  CH: There will be no effect to critical habitat from this activity.</p>
<p>34. <b>Guardrail Installation.</b> Damaged railings and support pillars are removed and replaced as needed at the Mowry Pumping Plant, and along the FK-Canal, Madera Canal, DM-Canal, and Coalinga Canal. Backhoes or other excavators, or shovels are used to excavate and fill pilot holes for support pillars. Vehicle mounted hoists may be used to remove damaged rails or reposition railings. Disturbance of soil may occur with installation or repair work, including possible damage or destruction of burrows.</p>	<p>BNLL, CTS, TKR, SJKF  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, and searches for burrows of small mammals, including those of listed kangaroo rats.</p>	<p>Follow O&amp;M Guidelines; follow guidelines for soil disturbance that may affect BNLL, kangaroo rats, and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Cover or use exclusion fencing around excavations that are left open overnight and are &gt;2 feet deep. In areas where BNLL are present, the action should be conducted during warm weather to allow this species to move away from the disturbance. Initial ground-disturbing activities in areas where leopard lizards are present will be scheduled to allow for blunt-nosed leopard lizard capture and relocation between 15 April and 1 July. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species with the exception of potential damage or destruction of burrows harboring CTS.  CH: There will be no effect to critical habitat from this activity.</p>



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<p>35 <b>Valve Rehabilitation.</b> Valve function is checked on pumps and when they do not operate, they are removed and repaired or replaced. Valve rehabilitation occurs at pumps on CC-Canal, the San Joaquin River, and the Main Delivery Channel, on FK-Canal, Friant Dam, Pacheco Conduit and Santa Clara Conduit. Work is contained within facilities. Disturbance to sites with these features occurs when conducting the work; however these features do not provide habitat for listed species and no effect to listed species or their habitats would be expected from this action.</p>	<p>None CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines. Use BMP's for protection against contamination of water by lubricants.</p>	<p>With implementation of the described avoidance /minimization there is no effect on listed species or their habitat.  CH: There will be no effect to critical habitat from this activity.</p>
<p>36 <b>Ladders/Safety Nets/Float Repair and Replacement.</b> Ladders, nets and floats at checks, siphons, dams, and turnouts on CC-Canal, Mowry Pumping Plant, FK-Canal, Madera Canal, DM-Canal, Friant Dam, and Coalinga Canal and PV Pumping Plant are inspected at least annually and repaired or replaced when damaged. Disturbance to sites with these features occurs when conducting this work, however, these features do not provide habitat for listed species and no effect to listed species or their habitats would be expected from this action.</p>	<p>None CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines.</p>	<p>With implementation of the described avoidance /minimization there is no effect on listed species or their habitat.  CH: There will be no effect to critical habitat from this activity.</p>

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<p>37 <b>Pull and Check Pumps.</b> Pumps enclosed in casings are raised with a hoist or winch, or for smaller units, by hand using the tether. Pump seals, bearings, impellers, motors and electrical connections are visually inspected or tested and replaced as needed. Pumps are checked annually to biannually at the Main Pumping Plant, Ygnacio Re-lift, and Pumping Plants 1- 4 on CC-Canal, every other year at pumps on the FK-Canal, every 10 to 20 years at Pacheco - PP and Coyote PP, and as needed at the Tracy Fish Facilities, San Joaquin River, DM-Canal and Friant Dam. This action does not affect listed species or habitats because pumps are encased and they do not provide habitat or access for listed species.</p>	<p>None CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines. Use BMP's to protect against contamination of water by lubricants.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species or their habitats.  CH: There will be no effect to critical habitat from this activity.</p>
<p>38 <b>Radial Gate Rehabilitation.</b> Gate faces are pressure washed or sandblasted and inspected and painted by hand with a brush to prevent corrosion. Trunions are greased and repaired or replaced. Rubber seals at gate edges are reconditioned or replaced. Corroded bolts and lift cables are replaced. Hoist gears and motors are lubricated. Radial gates on the CC-Canal, FK-Canal, Madera Canal, DM-C and Coalinga Canal are rehabilitated, as needed. The effects of this action are limited to disturbance of the gates in the dewatered section of canals</p>	<p>GGS CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines. Use BMP's to protect water from lubricants. In areas where GGS is present, conduct the action when GGS are in hibernacula.</p>	<p>With implementation of the described avoidance /minimization, there is no effect on listed species because disturbance at gates would occur when GGS is not active.  CH: There will be no effect to critical habitat from this activity.</p>

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<p>39 <b>Recorder House Maintenance (door repair, painting, cleaning etc.).</b> Recorder houses are swept, and doors are washed and painted by hand with a brush or roller, as necessary. at houses along the CC-Canal, Main Delivery Channel, FK-Canal, Madera Canal, Pacheco Conduit/ Tunnel and Santa Clara Conduit/Tunnel, and also the Coalinga Canal and PV-Pumping Plant. Disturbance to recorder houses occurs when conducting this work. However, recorder houses do not provide habitat for listed species and no effect to listed species or their habitats would be expected.</p>	<p>None CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines. Use BMP's to protect against environmental contamination by paint.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species or their habitats.  CH: There will be no effect to critical habitat from this activity.</p>
<p>40 <b>Removal of Trash from Canal.</b> Trash and waste is removed from virtually all of the project area conveyance facilities, including canals, wasteways, reservoirs and drainage channels on an ongoing basis. Small items are collected by hand disposed of properly. Where needed, trained hazardous waste handlers are enlisted to handle removal and waste disposal. Vehicles, refrigerators and other large appliances are removed with the aid of hoists. Trash is typically not habitat for listed species, but some items may provide limited food or temporary structural cover. The effects from trash removal are to temporarily disturb dumping sites. Removal likely enhances quality of existing habitat for listed species by reducing materials that are potentially injurious.</p>	<p>CRLF, GGS  CH: CTS, CRLF</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines. Large items such as vehicles or appliances in aquatic environments where CRLF and GGS may be found should be slowly removed to permit escape of these species. Utilize hazardous material specialists when needed to prevent environmental contamination.</p>	<p>With implementation of the described avoidance /minimization there is no effect on listed species other than temporary disturbance.  CH: There will be no effect to critical habitat from this activity.</p>
<p>41 <b>Right-of-Way Trash Removal.</b> Tires, plastics, lumber, bedding, scrap metal and other trash and garbage is removed by hand from rights of ways and hauled by truck to appropriate waste disposal site. Larger items such as vehicles and appliances are removed with the aid of service trucks with hoists or winches. Where needed, trained waste handlers are used to collect and dispose of hazardous wastes. Trash removal is a temporary disturbance to the environment. Potential cover and food is removed, however this likely enhances the quality of habitat for listed species by reducing potentially injurious, toxic or unhealthful materials from the environment.</p>	<p>None  CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.</p>	<p>Follow O&amp;M Guidelines.</p>	<p>With implementation of the described avoidance /minimization there is no effect on listed species.  CH: There will be no effect to critical habitat from this activity.</p>

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42 SCADA System Repair and Upgrade. Supervisory Control and Data Acquisition (SCADA) equipment is located at control structures at facilities. Repair includes removal and replacement of electrical, computer, or communications equipment, primarily modular components or panels. Repairs are made to the SCADA system on CC-Canal, Pumping Plants on CC-Canal, and Contra Loma Dam, on the FK-Canal, Madera Canal, at Pacheco Conduit/Tunnel, Santa Clara Conduit/Tunnel, at the Bifurcation Structure and at Pumping facilities, on DM-Canal, and at PV-Pumping Plant and Coalinga Canal. SCADA sites do not provide habitat for listed species.	None CH: None	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines.	With implementation of the described avoidance /minimization there is no effect on listed species.  CH: There will be no effect to critical habitat from this activity.

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43) <b>Sign Repair.</b> Damaged sign faces or supports are repaired. Faces of signs are repainted or replaced. Pilot holes for support posts are dug with an auger, shovel or equipment such as a backhoe. Repairs or replacement of signs occurs at most project facilities, on an as needed basis. This action results in limited ground disturbance that rarely might destroy or damage burrows and ground dwelling listed species.	CTS, CRLF, GGS, SJKF, TKR  CH: CTS, CRLF	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, and searches for burrows of small mammals, including those of listed kangaroo rats.	Follow O&M Guidelines. Follow guidelines for soil disturbance that may affect GGS, kangaroo rats, and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. In areas where GGS is present, the action should be conducted within periods of GGS activity (May to October), and during warm weather. Use BMP's for painting to avoid environmental contamination. SCCAO will, if needed, visit the site and advise on approaches to help minimize impacts.	With implementation of the described avoidance /minimization there is no effect of this action on listed species with the exception of potential damage or destruction of burrows, which rarely may harbor CTS and CRLF.  CH: WNM –This action will not modify any of the PCE's for either species' critical habitat.
44) <b>Stilling Well Maintenance (pumping/backflush etc.).</b> Stilling wells are concrete or metal pipes placed vertically in canals or connected to them via a pipe. Movement of water into the well permits accurate measurement of the height of water in the canal. Debris and silt that collects in the connector pipe or the well is backflushed with a pump to clear the system of debris as frequently as monthly at some locales, but more commonly annually, or as needed along the CC-Canal, San Joaquin River, Columbia Main Delivery Channel, FK-Canal, Madera Canal, DM-Canal, SL-Drain, and Coalinga Canal. Aquatic species such as GGS may temporarily rest in wells and would be disturbed when wells are cleaned.	GGS  CH: CTS, CRLF, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.	Follow O&M Guidelines. For wells in the range of the GGS, the well should be visually inspected for the presence of snakes before conducting the procedure. If a snake is observed in such a well, it should be left undisturbed and allowed to leave on its own unless it can be verified by a qualified person that the snake is not a GGS.	With implementation of the described avoidance /minimization there is no effect on listed species other than temporary disturbance to GGS.  CH: There will be no effect to critical habitat from this activity.

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<p>45. <b>Sump Pump Maintenance (electrical/mechanical/piping).</b> Sump pumps are used to prevent water buildup and flooding in low areas by transporting water from a collection well or low point into a canal or other conveyance facility (e.g. drainage ditch). Electrical connections and operation of pumps are checked and pumps that overheat, have bad bearings, and are noisy or otherwise fail during testing are repaired or replaced; the servicing interval depends on the site, but is done from quarterly to once every three years, or irregularly. Pumps are serviced on the CC-Canal, FK-Canal, at Pacheco Conduit/Tunnel, Santa Clara Conduit/Tunnel, DM-Canal, SL-Drain, Tracy Fish Facilities, Friant Dam, and PV-Pumping Plant. Sump pumps are enclosed within confined spaces. They do not provide suitable habitat for listed species and would therefore not affect listed species</p>	<p>None CH: None</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).</p>	<p>Follow O&amp;M Guidelines.</p>	<p>With implementation of the described avoidance /minimization there is no effect on listed species or their habitat. CH: There will be no effect to critical habitat from this activity.</p>
<p>46. <b>Turnout Repair (in-prism).</b> Turnouts are locations where water is discharged from a canal or pipeline to another facility. Turnouts may be metal or wood. Metal types have a slide gate that is controlled with a screw mechanism that raises or lowers the gate over an opening from the canal. A concrete boxlike structure supports the metal screw shaft and wheel mechanism. Wooden turnouts have metal or concrete frames that support wooden slats that cover the opening from the canal. Shafts on screw gates are lubricated with grease. Metal frames and gates are pressure washed or scrubbed with a brush or scraped and then painted to prevent corrosion. Rotted wood is replaced and any bent framing is repaired so slats can be easily adjusted. Concrete pads for turnouts are poured and guard railings around these structures are painted by hand. Turnouts are generally inspected annually during canal dewatering. They are repaired as needed on CC-Canal, FK-Canal, Madera Canal, Santa Pacheco Conduit/Tunnel, Clara Conduit/Tunnel, DM-Canal, SL-Drain, and Coalinga Canal. Disturbance occurs at the turnout during maintenance. These sites do not provide habitat for listed species, other than possibly to CTS that may be attracted to low wet spots in the dewatered canal. Paint and lubricants can contaminate water supplies.</p>	<p>CTS CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.</p>	<p>Follow O&amp;M Guidelines. Use BMP's for protection against contamination of water by lubricants and paints. Avoid action if CTS are present at site. Where feasible, consider use of vegetable based oil lubricants instead of petroleum based products.</p>	<p>With implementation of the described avoidance /minimization there is no effect of this action on listed species with the exception of potential temporary disturbance of CTS. CH: There will be no effect to critical habitat from this activity.</p>

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47 <b>Turnout Sandblasting and Painting (in-prism).</b> Metal turnout gates, slides and screw mechanisms are sandblasted to remove corrosion. The gates and slides are painted as required. Sandblast material and old paint are disposed of in appropriate manner. Sandblasting is done concurrently with dewatering, about every 10 to 15 years on the FK-Canal, every 25 years on the Pacheco Conduit/Tunnel, Santa Clara Conduit/Tunnel system and annually, where needed, on the Madera Canal. Disturbance occurs at the turnout during maintenance. These sites do not provide habitat for listed species, other than possibly to CTS that may be attracted to low wet spots in dewatered canals.	CTS  CH: CTS, CRLF, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species.	Follow O&M Guidelines. Use BMP's for protection against contamination of water by lubricants and paints. Avoid action if CTS are present at site. Where feasible, consider use of vegetable based oil lubricants instead of petroleum based products.	With implementation of the described avoidance /minimization there is no effect of this action on listed species with the exception of potential temporary disturbance of CTS.  CH: There will be no effect to critical habitat from this activity.

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48 Utility Trenching (SCADA/Power/Misc.) Work is done with a trencher, backhoe or excavator to lay underground utilities to facilities and upgrade the systems in place along the FK-Canal, Pacheco Conduit/Tunnel, Santa Clara Conduit/Tunnel, Coyote Pumping Plant, Bifurcation Structure, Hollister Conduits, DM-Canal, Friant Dam, and Tracy Pumping Plant. Most utility infrastructure has been provided and the need for trenching is infrequent. Trenching disturbs soil and may damage or destroy burrows inhabited by listed species or used by their prey.	GGS, SJKF, TKR  CH, CTS, CRLF	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines. Follow guidelines for soil disturbance that may affect GGS, kangaroo rats, and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. Avoid trenching in areas known to have GGS during their period of inactivity (November through April). When possible, avoid burrows in areas where CRLF and CTS are present and would be expected to be underground. Also avoid trenching where TKR and GKR may be present. Cover or use exclusion fencing around excavations that are left open overnight and are >2 feet deep. Compare location with known locations of utility or energy company pipelines. locate and insure avoidance of these pipelines.	With implementation of the described avoidance /minimization there is no effect of this action on listed species.  CH: WNM –The avoidance measures described will preclude any significant effect to the critical habitat.



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49 <b>Wash and Paint Turnouts and Check Structures.</b> Turnouts and checks are pressure washed with water or cleaned with a wire brush and painted with rollers or brushes using epoxy paint during dewatering. Turnouts and checks are generally washed annually and painted either annually or as needed on CC-Canal, Columbia Main Pumping Plant (gates only), FK-Canal, Madera Canal, Santa Clara Conduit/ Tunnel, Pacheco Conduit/Tunnel, DM-Canal, SL-Drain, and Coalinga Canal. These structures are disturbed during washing and painting. Accidental spill of paints could contaminate waterways. CRLF and CTS may be attracted to wet spots in dewatered canals and could be disturbed during maintenance.	CRLF, CTS, GGS  CH: CTS, CRLF, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, and searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines. Use BMP's to preclude contamination from paints. Conduct this action after GGS have entered hibernacula. Avoid working at sites if CRLF or CTS are present.	With implementation of the described avoidance /minimization there is no effect on listed species.  CH: There will be no effect to critical habitat from this activity.
50 <b>Wash Bridges.</b> Dirt is removed from bridges and railings with a portable pressure washer using water. Bridges on the San Luis Canal, FK-Canal, Madera Canal, DM-Canal and SL-Drain are washed annually. Railings on bridges over the Madera Canal are hand or spray painted after being washed. Bridges are not habitat for listed species. These actions would negligibly affect listed species by increasing turbidity with dirt washed into canals.	None  CH: CTS, CRLF, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area.	Follow O&M Guidelines. Use BMP's to preclude chemical contamination of water.	With implementation of the described avoidance /minimization there is no effect on listed species.  CH: There will be no effect to critical habitat from this activity.

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51 <b>Beach Belting.</b> A protective rock blanket (smoother and smaller than rip rap) linked together with cable or chain is laid on the inside bank within earthen sections of the FK-Canal and the DM-Canal. The "blanket" is transported to the site with a truck and pulled or laid into place. The action is done annually along the FK-Canal using approximately 20 cubic yards of blanket material. The action is done as needed on the DM-Canal. The action disturbs soil on the inner prism of the canal at and above the waterline. Temporary disturbance of the site by heavy equipment and damage or destruction of burrows may occur.	CTS, GGS, SJKF  CH: CTS	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG kit fox survey protocols, searches for kit fox dens.	Follow O&M Guidelines. Follow guidelines for soil disturbance that may affect GGS and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. If needed, SCCAO will visit the site and advise on approaches to help minimize impacts.	With implementation of the described avoidance /minimization there is no effect of this action on listed species except that burrows may be damaged or destroyed, reducing potential habitat for listed species and their prey. CTS inhabiting burrows would be buried.  CH: WNM – There may be a slight beneficial effect by creating cover habitat, similar to that described for rip-rap.
52 <b>Canal Liner Extension.</b> Where operating flows in canals range above the liner or where subsidence has caused slippage, additional height is added to the liner to protect against erosion and loss of containment. Unconsolidated soil above the liner may be excavated and filled with supportive soils and compacted by heavy equipment, after which these sites are graded. Forms are set and concrete or other similar material is poured in place. Alternatively, gummite may be applied to prepared banks. Extensions along the length of the FK-Canal, Madera Canal, DM-Canal and Coalinga Canal are made when canals are dewatered or are at low levels, typically in late fall through early spring. Heavy equipment disturbs soil and may damage or destroy burrows.	CTS, GGS, SJKF, TKR  CH: CTS	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols and searches for kit fox dens.	Follow O&M Guidelines. Follow guidelines for soil disturbance that may affect GGS and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. SCCAO will, if needed, visit the site and advise on approaches to help minimize impacts.	With implementation of the described avoidance /minimization there is no effect of this action on SJKF, with the exception that burrows may be damaged or destroyed, reducing potential habitat for listed species and their prey. Also, CTS or GGS inhabiting burrows would be buried.  CH: There will be no effect to critical habitat from this activity.

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<p>53) <b>Canal Desilting Operations.</b> Desilting is done at turnouts, wasteways and in the canals or their lateral drains along the Contra Costa Canal, Columbia Diversion Channel, Friant-Kern Canal, Madera Canal, Coalinga Canal, and at the Pleasant Valley Pumping Plant intake Channel. Desilting is done as needed; as frequently as monthly or as infrequently as canals are dewatered on main canals. Silt is flushed by opening gates or checks at wasteways and turnouts to remove sediment. Additionally, heavy equipment such as a long-stick, draglines or backhoes also may be used to physically remove accumulated sediments from the bottoms of canals or basins. Flushed sediment may be washed further down conveyance. Dredged sediment may be piled on a canal bank adjacent to the facility, be loaded in a truck and transported to either temporary or permanent spoil piles or be hauled to a site where it is used as fill. Sediment spoil piles may or may not be seeded to prevent erosion. Spoil may cover burrows and could bury listed species. New soil piles may be attractive to burrowing species.</p>	<p>BNLL, CTS, GGS, SJKF, TKR, VPFS</p> <p>CH: CTS, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols and searches for kit fox dens.</p>	<p>Follow O&amp;M Guidelines. Follow Clean Water Act Nationwide or Section 404 permits, as applicable. Follow guidelines for soil disturbance that may affect BNLL, GGS, kangaroo rats, and SJKF. For SJKF, a search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. In areas where BNLL is present, the action should be conducted during warm weather to allow this species to move away from the disturbance. Initial ground-disturbing activities in areas where leopard lizards are present will be scheduled to allow for blunt-nosed leopard lizard capture and relocation between 15 April and 1 July. Moist areas in dewatered canals may be utilized by CTS, CRLF, and GGS depending on the time of the dewatering. The work site should be examined and work avoided if these species are present (CTS expected from November to April, and April through October for GGS). Any dewatered habitat should remain dry for at least 15 consecutive days after April 15, prior to excavating or filling the dewatered habitat. Spoil material may not be used to destroy or modify vernal pools or vernal pool habitat.</p>	<p>With implementation of the described avoidance /minimization there is no direct effect on listed BNLL and SJKF. Spoil material used to fill low spots or depressions would eliminate potential habitat for VPFS. Burrows that harbor prey for listed species may be covered and some listed species (e.g. CTS) may be covered. If spoil cannot be hauled away and it is to be piled on banks where GGS may aestivate, and this work cannot be completed when GGS are still active because of restrictions on dewatering schedules, some GGS may be buried.</p> <p>CH: The critical habitat will not be adversely modified, and a slight beneficial effect may arise from the immigration of burrowing mammals into the areas where spoil is left.</p>

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<p>54   <b>Minor Road Construction/Rehabilitation.</b> Road rehabilitation or construction is done to provide new access to facilities or to recondition existing roads along the FK-Canal and Madera Canal. It can involve ripping and removal of existing asphalt, regrading of roadbed, compaction of the new bed and underlying soil. Sand is spread by truck, along with crushed rock, and new asphalt that is compressed. Road construction is done irregularly or on a limited scale annually. Ground disturbance may damage or destroy burrows on shoulders of roads.</p> <p>Major road construction/rehabilitation will be addressed under separate environmental review.</p>	<p>CTS, SJKF, TKR</p> <p>CH: CTS, CRLF, Vernal pool species</p>	<p>Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&amp;M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&amp;M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, and searches for burrows of small mammals, including those of listed kangaroo rats.</p>	<p>Follow O&amp;M Guidelines. Follow guidelines for soil disturbance that may affect kangaroo rats and SJKF. Pre-construction surveys for listed species will be conducted before work begins. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. Minimize vehicular travel off the roadway proper. SCCAO will visit the site and advise on approaches to help minimize impacts, if necessary.</p>	<p>With implementation of the described avoidance /minimization there are no direct effects on SJKF and TKR. Burrows may be damaged or destroyed. CTS present in shallow burrows could be crushed and there would be indirect loss of burrow habitat for listed species and potential prey.</p> <p>CH: WNM – With the required pre-construction surveys and other avoidance measures, critical habitat will not be modified to the threshold of adverse modification.</p>

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55 <b>Equalizing Reservoir Desilting.</b> Desilting is conducted on an irregular basis at Woollomes Reservoir, adjacent to the FK-Canal. Draglines, long sticks, gradalls or other earthmoving equipment such as front end loaders and dozers are used to pile and load removed silt from the basins for subsequent disposal. Aquatic vegetation rooted in the reservoirs is removed when reservoir pools are drawn down and silt is removed with heavy equipment. Operations are conducted about once every 10 years, during dewatering. Disposed spoil may cover burrows or fill habitat for VPFS. Elderberry plants may be damaged	SJKR, TKR, VELB, VPFS  CH: None	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Consult surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines. Follow Clean Water Act Nationwide or ACOE Section 404 permits as applicable. Follow guidelines for soil disturbance that may affect TKR and SJKF. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Spoil piles should be located away from areas with burrows that could provide habitat to listed species. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. Spoil piles should be located away from areas with burrows that could provide habitat to listed species. Flag or erect barricades around protected elderberry plants to avoid take. SCCAO will visit the site and advise on approaches to help minimize impacts, if needed.	With implementation of the described avoidance /minimization there is no effect of this action on listed species.  CH: There will be no effect to critical habitat from this activity.
56 <b>Dead Pool Pumping / Basin Discharge</b> – This action is not applied to facilities in SCCAO.	N/A  CH: N/A	N/A	N/A	None  CH: None

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57] <b>Structure Construction (Blockhouses, stilling wells etc.)</b> Structures are constructed irregularly along the FK-Canal, when new operational facilities are added. Sites are graded and forms set for pouring concrete pads. Framing may use concrete block, metal or wood, with metal siding. Trenching may be done to provide underground utilities to the site. Ground disturbance occurs at the site, potentially damaging or destroying burrows potentially used by listed species or by their prey.	CTS, SJKF, TKR  CH: CTS, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines. Follow guidelines for soil disturbance that may affect kangaroo rats and SJKF. Pre-construction surveys will be required for all construction areas. Coordination with Service will occur before construction begins if any listed species is found. For SJKFA search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. SCCAO will visit the site and advise on approaches to help minimize impacts, if needed.	With implementation of the described avoidance /minimization there is no effect of this action on listed species.  CH: WNM – With the required pre-construction surveys and other avoidance measures effects to the PCE's of the critical habitat will not reach the threshold of adverse modification.

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58 <b>Utility and Facilities Repair.</b> Irregularly completed. Major repairs are done with separate environmental review. Utility companies may send service vehicle to repair electrical connections, replace transformers. There is a limited chance for impacts to listed species when repairs require soil disturbance. Repairs may occur anywhere along facilities but are primarily conducted inside structures. Vehicle disturbance occurs and some trenching may be required to excavate underground utility lines. Burrows may be damaged or destroyed during trenching.	CTS, SJKF, TKR  CH: CTS, CRLF, Vernal pool species	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as: USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines. Follow guidelines for soil disturbance that may affect K-Rats, and SJKF. For SJKF A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Work may not continue if listed kangaroo rats are sighted unless the animals are relocated under a plan pre-approved by Reclamation, Service and CDFG and/or a mitigation plan is developed in coordination with Reclamation and approved by Service and CDFG. SCCAO will visit the site and advise on approaches to help minimize impacts.	With implementation of the described avoidance /minimization there is no effect of this action on listed species.  CH: WNM – Critical habitat will not be affected by building repairs.

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59) <b>Pump-in System Set-up During Flood Years.</b> Operational agreements permit occasional pump-ins during flood years. Pumps are temporarily placed along the DM-Canal and on the FK-Canal near the Kings, Kaweah, and Tule Rivers for pumped diversion of water into the canals. Pump sites are cleared and leveled with heavy equipment and temporary piping is laid. Soil is disturbed, burrows may be destroyed and vibration from pumps may affect fossorial or soil dwelling species.	SJKR  CH: None	Review LSM for species descriptions, their distributions and habitat use. Identify habitat(s) in which O&M actions will occur and which also support listed species. Determine where impacts to habitat(s) from the O&M action overlap with the potential for occurrence of listed species. Review the CNDDDB records and maps for species records of occurrence and their range distribution within the action area. Conduct surveys for presence of listed species in the action area. If needed, visit the action area to assess habitat and survey for listed species by conducting activities such as USFWS/CDFG kit fox survey protocols, searches for kit fox dens, searches for burrows of small mammals, including those of listed kangaroo rats, or elderberry plants (following USFWS Plant Survey Guidelines).	Follow O&M Guidelines for soil disturbing activities. A search to locate animal burrows occurring within 200 feet of a proposed work site will be made by field staff before undertaking the work. Any burrow with an entrance diameter greater than four inches and with a depth of greater than 12 inches will be assumed to be a potential kit fox den and will need to be examined by a biologist before maintenance work is begun. After grading, or other ground disturbing work, all culverts within the work area must be cleared. If a kit fox is in the culvert, it must be left undisturbed until the fox has left, after which time the culvert will be cleared. Excavation of soil using heavy equipment should be done carefully, especially when the excavation site is adjacent to grasslands in the northern 1/3 of the canal between Friant Dam and Orange Cove and rodent burrows are present to minimize chance for harm to CTS. SCCAO will visit the site and advise on approaches to help minimize impacts, if needed.	Effects to listed species would not likely occur as a result of this action.  CH: There is no critical habitat in the areas this action will occur in.



Area Office Manager

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