Appendix A

U.S. Fish and Wildlife Biological Opinion

United States Department of the Interior

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

IN REPLY REFER TO:
08EVEN00-2015-F-0141

June 10, 2016

Memorandum

To: Chief, Resource Management Division, Bureau of Reclamation, Fresno, California

From: Field Supervisor, Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service, Ventura, California

Subject: Biological Opinion for the San Felipe Pipeline Road/Levee and Culvert Repair Project, San Benito County, California (15-007) (8-8-15-F-14)

Dear Mr. Hyatt:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Bureau of Reclamation's (Reclamation) proposed repair of culverts along an existing levee operated under contract by the Santa Clara Valley Water District (SCVWD), and the project's effects on the federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*) and least Bell's vireo (*Vireo bellii pusillus*), and federally threatened California red-legged frog (*Rana draytonii*) and California tiger salamander (*Ambystoma californiense*) and its critical habitat, in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). You determined that this project would have no effect on the federally threatened Bay checkerspot butterfly (*Euphydryas editha bayensis*) or south central California steelhead (*Onchyrhynchus mykiss*), the federally endangered California least tern (*Sternula antillarum browni*), or designated critical habitat for the California red-legged frog. We do not provide concurrence for no effect determinations and the steelhead is under the separate jurisdiction of National Marine Fisheries Service, so these species will not be considered further. We received your February 18, 2015 request for formal consultation on February 20, 2015.

We have based this biological opinion on information that accompanied your February 18, 2015 request for consultation, including the biological assessment (BA; Reclamation 2015), sensitive species survey report (Rana Resources 2003), San Felipe Lake fisheries report (Smith 2005), and California tiger salamander surveys and site assessments report (HTH 2012); the San Joaquin kit fox survey report (SCVWD 2011) submitted separately on November 30, 2015; and other information in our files. We can make available a record of this consultation at the Ventura Fish and Wildlife Office.

Consultation History

On July 28, 2003, the Service received a request from Reclamation for our concurrence that the proposed San Felipe Preventative Maintenance Shutdown Project was not likely to adversely affect the San Joaquin kit fox, California red-legged frog, federally threatened vernal pool fairy shrimp (*Branchinecta lynchi*), or then-federally proposed threatened California tiger salamander and would have no effect on the least Bell's vireo. The project involved temporarily shutting down and draining a section of Reclamation's Santa Clara Conduit (SCC) water pipeline at the Calavaras Fault Inlet and Outlet sites. On August 21, 2003 the Service concurred by letter that the proposed action was not likely to adversely affect the subject species and would have no effect on the least Bell's vireo, because of the known distribution of listed and proposed species in the project vicinity and proposed avoidance measures which included pre-construction surveys, delineation of buffer areas, and control of water discharges to prevent soil erosion.

On June 21, 2007, the Service received a request from Reclamation for our concurrence that the proposed SCC Road Repair Project was not likely to adversely affect the San Joaquin kit fox, least Bell's vireo, California red-legged frog, or California tiger salamander and its critical habitat. The project involved road and minor culvert repairs at Reclamation's San Felipe Pipeline Road/Levee in three areas above the ordinary high water mark using geofoam blocks for fill, and replacement of buried telemetry cable used to control pipeline valves. On September 6, 2007, the Service concurred by letter that the proposed action was not likely to adversely affect the subject species or critical habitat due to the lack of suitable habitat within the project area, the proposed project timing, and proposed avoidance measures.

Reclamation conducted two additional projects on the San Felipe Pipeline Road/Levee, in 2011 and 2013, to repair sections of roadway and replace two failed metal culverts with high-density polyethylene pipe. The culverts were located within the same segment of levee where the proposed action would occur and the project included work below the ordinary high water mark. Reclamation and SCVWD required avoidance measures to protect listed species and their critical habitat and determined that both projects would have no effect, thus did not consult with the Service (Reclamation 2015).

On February 20, 2015, the Service received a memorandum from Reclamation requesting formal consultation on the effects of the proposed San Felipe Pipeline Road/Levee and Culvert Repair project on the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander and its critical habitat. On June 10, 2015, Service and Reclamation staff exchanged electronic mails regarding the absence from the project description of certain avoidance and minimization measures for California tiger salamanders normally required by the California Department of Fish and Wildlife (CDFW) for projects with the potential to affect this also-State listed species. In November 2015 Reclamation and Service staff had several discussions about the project concerning potential changes and additions to conservation measures proposed in Reclamation's BA, CDFW-required avoidance and minimization measures for California tiger salamanders including burrow excavation and relocation of individuals, and exchange of additional information. In January 2016 Reclamation, SCVWD, and the Service

agreed on final language for the conservation measures included in this biological opinion to reduce impacts to listed species.

On March 15, 2016, we received via electronic mail a request form the Army Corps of Engineers (ACOE) to conduct emergency consultation on the project for the California red-legged frog and California tiger salamander, because SCVWD was concerned that flood damage to two of the culverts proposed for repair was compromising the road, telemetry line, and pipeline, thus posing a risk to human health and safety. We concurred and initiated emergency consultation via electronic mail on March 16, 2016, providing conservation measures to avoid listed species. A series of conversations took place in April between ACOE, Reclamation, SCVWD and the Service discussing the project; ultimately emergency repairs were never undertaken, and all parties agreed to complete consultation using Reclamation's initial request for consultation and related information.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Reclamation proposes to allow SCVWD, under an existing operation and maintenance contract, to replace deteriorated culverts in Reclamation's San Felipe Pipeline Road/Levee, north of Hollister in San Benito County, California. The approximately 3,900- foot-long road/levee provides access to vaults housing inlet and outlet control valves, the Calaveras Fault Inlet and Calaveras Fault Outlet (CFI and CFO), associated with a section of Reclamation's Santa Clara Conduit water pipeline where it crosses the Calaveras Fault. The levee represents the only access route to the CFI when winter rains inundate the surrounding area which has a high water table, and the levee supports a telemetry cable buried beneath the roadbed which allows remote shutoff of the control valves. The proposed project is necessary to prevent catastrophic failure of the levee road above the existing deteriorated metal arch culverts and avoid loss of direct and remote access to the CFI in the event of an emergency.

Four existing culverts in the western half of the San Felipe Pipeline Road/Levee would be removed via excavation through the roadbed. The deteriorated culverts would be replaced at the same locations (stations) with one 100-foot and three 50-foot long x 30-inch diameter round HDPE culverts (see Fig. 2 in Reclamation 2015). Replacement culverts would be surrounded by fill with compaction and the levee height and slope would be reconstructed. Telemetry cable would be repositioned beneath the roadway, the road surface would be restored, and the levee sides protected with armor stone. Heavy equipment would include an excavator and dump truck and a vibratory tamper would be used to compact soil. No surplus fuel would be stored onsite and refueling performed as needed. SCVWD Construction/Environmental BMPs would be followed.

Wetland and grassland areas adjacent to the levee berm would be avoided if possible, and any necessary work in these areas would be limited to within clearly defined boundaries. Replacement of the westernmost culvert where Tequisquita Slough passes beneath the levee

(Station 86+80, Fig. 2, Reclamation 2015) would likely require dewatering through installation of a temporary coffer dam and pumping of water at an estimated rate of 5 to 10 gpm from the levee area to a downstream location, using a gasoline powered pump placed on the levee crest within a spill containment berm. Access to the project site would be via the existing levee road. A staging and storage area surrounded by silt fencing would be created west of the CFO vault at a previously disturbed location along the road (Fig. 3, Reclamation 2015), where removed soil would be stockpiled and replacement stone and soil stored along with vehicles. Project activities would take place primarily during daylight hours in the dry season and require an estimated nine weeks to complete.

To reduce impacts to listed species, Reclamation and SCVWD propose to implement the following measures, which include measures originally proposed by Reclamation and additional measures recommended by the Service.

Measures 1 through 19 were included in the BA, and in some cases modified after discussion with the Service:

1. Prior to the start of construction, a biologist approved by the Service will conduct surveys for California red-legged frogs, California tiger salamanders, least Bell's vireos, and San Joaquin kit foxes. Surveys for San Joaquin kit foxes will take place between 14 and 30 days prior to the start of construction following Service (2011) guidance. Surveys for other listed species will take place within 48 hours of the start of work activities.

2. Construction activities will utilize the existing levee surface and avoid disturbance of areas designated as wetlands to the extent practicable. Work areas in wetlands will be clearly marked.

3. Areas to be dewatered at culvert Station 86+80 and downstream discharge sites will be included in preconstruction surveys and daily monitoring for listed species. Fish screens with mesh size 0.2 inch or less will be installed on pumping equipment to prevent entrapment of amphibians.

4. No work will be performed if a rain event of 0.5 inches or greater in a 24-hour period occurs. Construction may resume only after precipitation ceases, a drying-out period of 48 hours is observed, and the Service-approved biologist inspects all work areas to verify absence of California red-legged frogs and California tiger salamanders.

5. Soil stockpile areas will be covered at night to discourage habitation by animals, and inspected in the morning for burrows and listed species prior to disturbance.

6. Excavation sidewalls will be covered to prevent sediment runoff in event of rain, and silt fencing will be installed around excavation boundaries. SCVWD construction/environmental best management practices will be implemented.

7. The Service-approved biologist(s) and all work personnel will visually inspect for California red-legged frogs and California tiger salamanders under and around vehicles and equipment prior to use.

8. Prior to construction activities, all known or occupied San Joaquin kit fox dens will be identified by flagging and a 100-foot buffer; all known San Joaquin kit fox natal dens will be identified by flagging and a 150-foot buffer; and all occupied San Joaquin kit fox natal dens will be identified by flagging and a 200-foot buffer. For occupied natal dens, Reclamation will also contact the Service for guidance on adjusting the 200-foot buffer. No work activities that would result in effects to a den or occupants would occur within the buffers until it is determined to be unoccupied by the Service-approved biologist. If a San Joaquin kit fox is observed in the action area or an occupied den is identified, Reclamation will contact the Service immediately.

   Any potential kit fox dens that would be unavoidably destroyed by planned project activities may be excavated and backfilled in accordance with Service (2011) guidelines without prior notification, provided that excavation is approved and supervised by the Service-approved biologist. However, if during excavation a potential den is determined to be a currently or previously used den, the Service will be notified immediately, and all work on the project site will cease if a potential den is found to be currently occupied by San Joaquin kit fox.

   If it is determined that construction activities would unavoidably destroy a known den, Reclamation will notify the Service immediately. If the Service concurs that avoidance of the known den is not possible, the project proponent will take the following sequential steps:

   a) Allow for 3 consecutive days of monitoring to determine the occupancy status of the den. Activity at the den will be monitored by using tracking medium at the entrance or stationary infrared beam cameras and by spotlighting. If no activity is observed, actions described below under Steps b and c may be implemented. If San Joaquin kit fox activity is observed, Reclamation will contact the Service immediately for further guidance.

   b) Once a known den is determined to be unoccupied, methods such as one-way doors will be used to prevent subsequent occupancy by San Joaquin kit foxes before the burrow is excavated (Step c).

   c) Known dens determined to be unoccupied during Step a will be excavated by hand under the supervision of the Service-approved biologist; no more than 4 inches will be removed at a time. If at any time during excavation a San Joaquin kit fox is discovered inside the den, all activity will cease immediately, the Service will be notified, and monitoring described above under Step a will resume. Natal dens will not be disturbed at any time.

9. A Service-approved biologist will be present on-site during all work activities to ensure implementation of avoidance and minimization measures. Qualifications of the biologist(s) will be presented to the Service for approval at least 30 days prior to the start of construction.

The biologist(s) will have the authority to stop work if there is threat of harm to listed species or if any measures are not being fulfilled, and will notify the Service within one working day of any work stoppage.

10. Prior to initiation of work activities, the Service-approved biologist will provide a worker environmental awareness training for all personnel including project representatives responsible for reporting take to the Service. Training will also be required of new or additional personnel before they are allowed to access the project site. At a minimum, training will include information on identifying California red-legged frogs, California tiger salamanders, least Bell's vireos, and San Joaquin kit foxes, their ecology and habitat requirements, the boundaries within which the project must be accomplished and vehicle travel will be restricted, and the avoidance and minimization measures to be followed.

11. The limits of all work areas including staging, construction, parking, and access routes will be flagged prior to disturbance and all activity confined to within the marked areas.

12. Nighttime construction will be avoided to the extent practicable. If necessary, night lighting will be shielded, downward-directed and illuminate only the work area.

13. Disturbances to habitats of listed species will be minimized to the extent practicable. Vehicle traffic will be restricted to established roads and designated areas and utilize previously disturbed areas to the extent practicable. Vehicle use areas will be included in preconstruction surveys.

14. A speed limit of 15-miles-per-hour will be established for the project area.

15. No pets of any kind will be permitted in the project area.

16. Excavated holes and trenches will be covered with plywood or similar material at the close of each working day or provided with soil or wooden escape ramps to facilitate escape of trapped animals, and visually inspected by the biologist prior to backfilling. All stored pipes, culverts, or similar structures stored overnight will be inspected for animals before being moved, buried, or capped.

17. Equipment will be maintained per manufacturers' specifications to prevent leaks of fluids including gasoline, oils, or solvents. Refueling will be conducted at least 100 feet from aquatic or riparian habitat in a location where spills will not drain toward such habitats. A fuel and chemical spill containment and cleanup plan will be in place prior to start of work activities.

18. All food-related trash items such as wrappers, cans, bottles, bags, and food scraps will be disposed of in covered containers and removed at least once daily from the project site.

19. SCVWD will submit a final report to the Service which will include documentation of compliance with the conservation measures, a description of all project activities conducted and areas affected by the project, and all encounters with listed species including date, location, time, activity, and nature of the take, if applicable.

    Measures 20 through 23 were not included in the BA but were recommended by the Service as additional measures to avoid and minimize impacts to listed species, and were accepted by Reclamation and SCVWD:

20. Construction activities will be conducted between July 18 and October 30 to avoid and minimize impacts to listed species.

21. The Service-approved biologist(s) will have the authority to handle California red-legged frogs and California tiger salamanders. If an individual of these species is observed in an area to be affected by project activities, the biologist will capture and relocate the animal to nearby suitable habitat out of harm's way. Relocation sites will be identified prior to the start of the project.

22. To avoid impacts to least Bell's vireos, noise levels in riparian habitat within the action area will be kept below 60 decibels. If a least Bell's vireo nest is detected at any time, a 500-foot buffer will be established around the nest within which work will be suspended until vireos leave the area. A smaller buffer may be established if deemed protective by the Service-approved biologist. The biologist will monitor the nest when activities occur immediately adjacent to the buffer zone to determine the effects of project activities on nesting least Bell's vireos.

23. To avoid transferring disease or pathogens between aquatic habitats during the course of surveys or handling of California red-legged frogs or California tiger salamanders, the Service-approved biologist will follow the Declining Amphibian Populations Task Force (DAPTF) Fieldwork Code of Practice (DAPTF 1998; Appendix A). The biologist may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. All traces of the disinfectant will be removed before entering the next aquatic habitat.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both

the survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species" (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide conditions of the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander, the factors responsible for that condition, and the species' survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of these species; (3) the Effects of the Action, which identifies the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander in the wild by reducing the reproduction, numbers, and distribution of that species.

Adverse Modification Determination

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of designated critical habitat. A final rule revising the definition of "destruction or adverse modification of critical habitat" was published on February 11, 2016 (81 FR 7214). The revised definition states: "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

The revised "destruction or adverse modification" definition focuses on how Federal actions affect the quantity and quality of the physical or biological features[1] in the designated critical habitat for a listed species and, especially in the case of unoccupied habitat, on any impacts to

1 The critical habitat rule for the California tiger salamander central population uses the term "primary constituent elements" (PCEs) to describe the "physical and biological features" (PBFs) as used in the revised definition of "destruction or adverse modification of critical habitat." For this biological opinion, PCEs and PBFs are considered synonymous.

the critical habitat itself. Specifically, the Service will generally conclude that a Federal action is likely to "destroy or adversely modify" designated critical habitat if the action results in an alteration of the quantity or quality of the essential physical or biological features of designated critical habitat, or that precludes or significantly delays the capacity of that habitat to develop those features over time, and if the effect of the alteration is to appreciably diminish the value of critical habitat for the conservation of the species.

The Service may consider other kinds of impacts to designated critical habitat. For example, some areas that are currently in a degraded condition may have been designated as critical habitat for their potential to develop or improve and eventually provide the needed ecological functions to support species' recovery. Under these circumstances, the Service generally concludes that an action is likely to "destroy or adversely modify" the designated critical habitat if the action alters it to prevent it from improving over time relative to its pre-action condition. The "destruction or adverse modification" definition applies to all physical or biological features; as described in the proposed revision to the current definition of "physical or biological features" (50 CFR 424.12), "[f]eatures may include habitat characteristics that support ephemeral or dynamic habitat conditions" (79 FR 27066).

The adverse modification analysis in this biological opinion relies on four components: (1) the Status of Critical Habitat, which describes the range-wide condition of designated critical habitat for the California tiger salamander central population, in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the Environmental Baseline, which analyzes the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated and interdependent activities on the PCEs and how that will influence the recovery role of the affected critical habitat unit; and (4) Cumulative Effects, which evaluates the effects of future non-Federal activities that are reasonably certain to occur in the action area on the PCEs and how that will influence the recovery role of affected critical habitat unit.

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

STATUS OF THE SPECIES AND CRITICAL HABITAT

San Joaquin Kit Fox

The San Joaquin kit fox was listed as an endangered species on March 11, 1967 (Service 1967). The San Joaquin kit fox is the umbrella species for the Recovery Plan for Upland Species of the

San Joaquin Valley, California, indicating that measures used for recovery of the species would also benefit other species with overlapping ranges and habitat requirements (Service 1998a).

The kit fox is one of the smallest canid species in North America, and the San Joaquin kit fox is the largest subspecies of kit fox in skeletal measurements, body size, and weight. Adult males average 31.7 inches in total length, and adult females average 30.3 inches in total length (Grinnell et al. 1937). All kit foxes have long slender legs and are approximately 12 inches high at the shoulder. The average weight of adult males is 5.0 pounds, and the average of adult females is 4.6 pounds (Morrell 1972). General physical characteristics of kit foxes include a small, slim body, relatively large ears set close together, narrow nose, and a long, bushy tail tapering slightly toward the tip. The tail is typically carried low and straight.

Color and texture of the fur coat of all kit foxes varies geographically and seasonally. The most commonly described colorations are buff, tan, grizzled, or yellowish-gray dorsal coats (McGrew 1979). Two distinctive coats develop each year: a tan summer coat and a silver-gray winter coat (Morrell 1972). The ear pinna (external ear flap) is dark on the back side, with a thick border of white hairs on the forward-inner edge and inner base. The tail is distinctly black-tipped.

In the San Joaquin Valley before 1930, the range of the San Joaquin kit fox extended from southern Kern County north to Tracy, San Joaquin County, on the west side, and near La Grange, Stanislaus County, on the east side (Grinnell et al. 1937; Service 1998a). Historically, this species occurred in several San Joaquin Valley native plant communities. In the southernmost portion of the range, these communities included Valley Sink Scrub, Valley Saltbush Scrub, Upper Sonoran Subshrub Scrub, and Annual Grassland. San Joaquin kit foxes currently inhabit some areas of suitable habitat on the San Joaquin Valley floor. They can be found 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. They also inhabit some of the larger scattered islands of natural land on the valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced Counties.

The largest extant populations of kit foxes are in western Kern County on and around the Elk Hills and Buena Vista Valley and in the Carrizo Plain Natural Area, San Luis Obispo County. The Ciervo-Panoche core area in eastern San Benito, western Fresno, and southern Merced Counties, while not one of the largest extant populations, includes over 52,000 acres of BLM-administered land that offer some protection to the kit fox. Even so, much of the BLM-administered land in the core area is not suitable for kit fox due to its rugged character and shallow soils. Most suitable kit fox habitat in the core area is on private land in the valley floors (O'Farrell 1981).

Though the central and northern portions of the range have not been continuously monitored, populations were recorded in the late 1980s at San Luis Reservoir, Merced County (Briden et al. 1987); North Grasslands and Kesterson National Wildlife Refuge (NWR) on the valley floor, Merced County (Paveglio and Clifton 1988); and in the Los Vaqueros watershed, Contra Costa

County in the early 1990s (Service 1998a). Smaller populations are also known from other parts of the San Joaquin Valley floor, including Madera County and eastern Stanislaus County (Williams 1990).

Kit foxes occur at varying densities in the areas between the core populations (e.g., Panoche-Coalinga and Kettleman Hills). These populations provide links between core populations and also probably with smaller, more isolated populations in adjacent valleys (e.g., Panoche Valley) and in the Kreynhagen Hills and Anticline Ridge around Coalinga and Avenal.

Kit foxes prefer loose-textured soils (Grinnell et al. 1937; Hall 1946; Egoscue 1962; Morrell 1972), but are found on virtually every soil type. Dens appear to be scarce in areas with shallow soils because of the proximity to bedrock (O'Farrell and Gilbertson 1979), high water tables (McCue et al. 1981), or impenetrable hardpan layers (Morrell 1972). However, kit foxes will occupy soils with high clay content where they modify burrows dug by other animals (Orloff et al. 1986). Sites that may not provide suitable denning habitat may be suitable for feeding or providing cover. Kit fox dens are commonly located on flat terrain or on the lower slopes of hills. Common locations for dens are washes, drainages, and roadside berms. Kit foxes also commonly den in human-made structures, such as culverts and pipes (O'Farrell 1984; Spiegel and Tom 1996).

In the San Joaquin Valley, optimal habitats for San Joaquin kit foxes generally are those in which conditions are more desert-like, such as arid shrublands and grasslands (Service 1998a). These areas are characterized by sparse or no shrub cover, sparse ground cover with patches of bare ground, short vegetative structure less than 18 inches tall, and sandy to sandy-loam soils.

Tall or dense vegetation generally is less optimal for foxes (Smith et al. 2005). Such conditions make it difficult for foxes to detect approaching predators or capture prey. Kit foxes also tend to avoid rugged steep terrain; predation risk apparently is higher for foxes under such topographic conditions (Warrick and Cypher 1998). In general, flat terrain or slopes less than 5 percent are optimal, slopes of 5 to 15 percent are suitable, and slopes greater than 15 percent are unsuitable. For this reason, the foothills of the Coast Ranges generally are considered to demark the western boundary for suitable kit fox habitat.

Ground disturbance from tilling, maintenance, and harvesting is frequent and can destroy dens. Also, most agricultural lands in the San Joaquin Valley are irrigated, which can flood and collapse dens. Agricultural lands also are subject to intensive chemical applications, including fertilizers, pesticides, defoliants, and weed suppression; these practices can result in a lack of prey availability for kit foxes. Use of rodenticides is common in some agricultural environments and is particularly problematic for kit foxes due to the potential for secondary poisoning.

San Joaquin kit foxes appear to be strongly linked ecologically to kangaroo rats (*Dipodomys sp.*). San Joaquin kit foxes are especially well adapted for preying on kangaroo rats, and consequently, San Joaquin kit fox abundance and population stability are highest in areas where kangaroo rats are abundant (Service 1998a; Cypher 2003).

The diet of the San Joaquin kit fox varies geographically, seasonally, and annually, based on temporal and spatial variation in abundance of potential prey. Kangaroo rats, pocket mice (*Perognathus sp., Chaetodipus sp.*), and other nocturnal rodents can comprise about one-third or more of their diets. Kit foxes are also known to prey on California ground squirrels (*Otospermophilus beechyi*), black-tailed hares (*Lepus californicus*), San Joaquin antelope squirrels (*Ammospermophilus nelsoni*), desert cottontails (*Sylvilagus audubonii*), ground-nesting birds, and insects (Scrivner et al. 1987a).

Adult San Joaquin kit foxes are typically solitary during late summer and fall. In September and October, adult females begin to excavate and enlarge natal dens (Morrell 1972). Pups are born between February and late March (Egoscue 1962; Morrell 1972). Mean litter sizes reported for San Joaquin kit fox range from 2.0 to 3.8 individuals at the Naval Petroleum Reserve (White and Ralls 1993; Spencer et al. 1992; Spiegel and Tom 1996; Cypher et al. 2000). Pups appear above ground at about age 3 to 4 weeks, and are weaned at age 6 to 8 weeks.

Estimates of fox density vary greatly throughout its range and have been reported as high as 1.2 animals per square kilometer in optimal habitats in good years (Service 1998a). At the Elk Hills in Kern County, density estimates varied from 0.3 animal per square mile in the early 1980s to 0.004 animal per square mile in 1991 (Service 1998a). Kit fox home ranges vary in size and are generally approximately 1.0 square mile (Knapp 1979; Spiegel and Tom 1996; Service 1998a). Individual home ranges overlap considerably, at least outside the core activity areas (Morrell 1972; Spiegel 1996).

Although most young kit foxes disperse less than 8 kilometers (Scrivner et al. 1987b), dispersal distances of up to 75 miles have been documented for the San Joaquin kit fox (Scrivner et al. 1993; Service 1998a). Dispersal can be through disturbed habitats, such as agricultural fields, and across highways and aqueducts. The age at dispersal ranges from 4 to 32 months (Cypher 2003). Among juvenile kit foxes surviving to July 1 at the Naval Petroleum Reserve, 49 percent of the males dispersed from natal home ranges while 24 percent of the females dispersed (Koopman et al. 2000). Among dispersing kit foxes, 87 percent did so during their first year. Some kit foxes delay dispersal and may inherit their natal home range.

San Joaquin kit foxes are primarily nocturnal, although individuals (mostly pups) are occasionally observed resting or playing near their dens during the day (Grinnell et al. 1937). A mated pair of kit foxes and their current litter of pups usually occupy each home range. Other adults, usually offspring from previous litters, also may be present (Koopman et al. 2000), but individuals often move independently within their home range (Cypher 2003). Average distances traveled each night range from 5.8 to 9.1 miles and are greatest during the breeding season (Cypher 2003).

Kit foxes maintain core home range areas that are exclusive to mated pairs and their offspring (White and Ralls 1993; Spiegel 1996; White and Garrott 1997). This territorial spacing behavior eventually limits the number of foxes that can inhabit an area, owing to shortages of available space and per capita prey. Hence, as habitat is fragmented or destroyed, the carrying capacity of

an area is reduced and a larger proportion of the population is forced to disperse. Increased dispersal generally leads to lower survival rates and, in turn, decreased abundance. This is because greater than 65 percent of dispersing juvenile foxes die within 10 days of leaving their natal range (Koopman et al. 2000).

The distribution and abundance of the San Joaquin kit fox has decreased since its listing in 1967. This trend is almost certain to continue into the foreseeable future unless measures are implemented to protect, sustain, and restore suitable habitats and alleviate other threats to their survival and recovery.

Less than 20 percent of the habitat in the historical range of the San Joaquin kit fox remained when the subspecies was listed as endangered in 1967, and there has been a substantial net loss of habitat since that time. Historically, San Joaquin kit foxes occurred throughout California's Central Valley and adjacent foothills. Extensive land conversions in the Central Valley began as early as the mid-1800s. By the 1930s, the range of the kit fox had been reduced to the southern and western parts of the San Joaquin Valley (Grinnell et al. 1937). The primary factor contributing to this restricted distribution was the conversion of native habitat to irrigated cropland, industrial uses (e.g., hydrocarbon extraction), and urbanization (Laughrin 1970; Jensen 1972; Morrell 1972; 1975). Approximately half the natural communities in the San Joaquin Valley were tilled or developed by 1958 (Service 1980).

This rate of loss accelerated following the completion of the Central Valley Project and the State Water Project, which diverted and imported new water supplies for irrigated agriculture (Service 1995). From 1959 to 1969 alone, an estimated 34 percent of natural lands were lost within the then-known kit fox range (Laughrin 1970). Most of the documented loss of habitat has been the result of conversion to irrigated agriculture.

The conversion of natural lands to agriculture continues to be a threat on private lands on the western side of the San Joaquin Valley floor; here agriculture has been extended west to the base of the foothills since the 1960s (Kelly et al. 2005). Large blocks of suitable habitat that support kit fox do remain in the Panoche and Pleasant Valleys in the foothills slightly to the west of the San Joaquin Valley (Cypher et al. 2007). However, including both these areas and the western uplands of Fresno County, there were only 5,559 acres of suitable habitat and 20,543 acres of less than optimal habitat remaining by 2007 (Cypher et al. 2007).

Land conversions contribute to declines in kit fox abundance through direct and indirect mortalities, displacement, prey population and denning site reduction, changes in the distribution and abundance of larger canids that compete with kit foxes for resources, and carrying capacity reductions.

Extensive habitat destruction and fragmentation have contributed to smaller, more isolated populations of kit foxes. Small populations have a higher probability of extinction than large populations because their low abundance renders them susceptible to random events, such as high variability in age and sex ratios, and catastrophes, such as floods, droughts, and disease

epidemics (Lande 1988; Frankham and Ralls 1998; Saccheri et al. 1998). Similarly, isolated populations are more susceptible to extirpation by accidental or natural catastrophes because the likelihood of recolonization has been diminished.

These stochastic events can adversely affect small, isolated populations with devastating results. Extirpation can even occur when the members of a small population are healthy, because whether the population increases or decreases in size depends less on the age-specific probabilities of survival and reproduction than on chance. Owing to the probabilistic nature of extinction, many small populations will eventually go extinct when faced with these random risks (Caughley and Gunn 1996).

Vehicles appear to be the primary cause of mortality for urban kit foxes, and most strikes occur on arterial roads, which have higher traffic volumes and speed limits (Bjurlin et al. 2005; Cypher et al. 2005). Two-lane roads may not be as dangerous for kit foxes as are major arterial roads (Cypher et al. 2005). Kit foxes are more frequently struck near intersections between major roads and other linear rights-of-way, such as railroads, canals, and other roads. These most likely function as movement corridors for kit foxes, and the foxes do not appear to avoid roads for denning sites (Bjurlin et al. 2005).

The diets and habitats selected by coyotes (*Canis latrans*) and kit foxes living in the same areas are often quite similar (Cypher and Spencer 1998). Hence, the potential for resource competition between these species may be quite high when prey resources are scarce, such as during droughts, which are quite common in semiarid central California. Land conversions and associated human activities have led to changes in the distribution and abundance of coyotes, which compete with kit foxes for resources.

Coyotes are the primary cause of mortality for kit foxes in most areas (Cypher et al. 2003). The threat to kit foxes from red foxes (*Vulpes vulpes*) is still being evaluated, but the potential for both interference and exploitative competition is high (Cypher et al. 2001). The red fox is a highly adaptable species, able to persist in agricultural lands; they do not depend on dens for cover, they are highly mobile, which facilitates avoiding dangers and locating food, and they are highly omnivorous. Coyotes occur in most areas with abundant populations of San Joaquin kit foxes. During the past few decades, coyote abundance has increased in many areas owing to a decrease in ranching, favorable landscape changes, and reduced control efforts (Orloff et al. 1986; Cypher and Scrivner 1992; White and Ralls 1993; White et al. 1996). Although coyotes are common in both natural and agricultural landscapes, they pose a greater predation threat to the kit fox on agricultural lands because of the decreased availability or absence of escape dens and vegetative cover (Cypher et al. 2005).

Coyotes may kill San Joaquin kit foxes in an attempt to reduce resource competition. Injuries from coyotes accounted for 50 to 87 percent of the mortalities of radio-collared kit foxes at Camp Roberts, the Carrizo Plain Natural Area, the Lokern Natural Area, and the Naval Petroleum Reserves (Cypher and Scrivner 1992; Standley et al. 1992; Ralls and White 1995; Spiegel 1996).

Some methods of pest and rodent control pose a threat to kit foxes through direct or secondary poisoning, and these threats are often encountered in agricultural settings. Kit foxes may be killed if they ingest rodenticide in a bait application, or if they eat a rodent that has consumed the bait. Even sublethal doses of rodenticides may lead to the death of these animals by impairing their ability to escape predators or find food. Pesticides and rodenticides may also indirectly affect the survival of kit foxes by reducing the abundances of their staple prey species. For example, the California ground squirrel, which is the staple prey of kit foxes in the northern portion of their range and on agricultural lands, was thought to have been eliminated from Contra Costa County in 1975, after extensive rodent eradication programs. Field observations indicated that the long-term use of ground squirrel poisons in this county severely reduced kit fox abundance through secondary poisoning and the suppression of populations of its staple prey (Orloff et al. 1986).

Historically, kit foxes may have existed in a metapopulation structure of core and satellite populations, some of which periodically experienced local extinctions and recolonization (Service 1998a). However, today's populations exist in an environment drastically different from the historical one, and extensive habitat fragmentation has resulted in geographic isolation, smaller population sizes, and reduced genetic exchange among populations. This increases the vulnerability of kit fox populations to extirpation.

Populations of kit foxes are extremely susceptible to the risks associated with small population size and isolation because they are characterized by marked instability in population density. For example, the relative abundance of kit foxes at the Naval Petroleum Reserves, California, decreased ten-fold between 1981 to 1983, increased seven-fold between 1991 to 1994, and then decreased two-fold in 1995 (Cypher and Scrivner 1992; Cypher and Spencer 1998).

The destruction and fragmentation of habitat could also eventually lead to reduced genetic variation in populations of kit foxes that are small and geographically isolated. Genetic assessments indicate that historical gene flow among populations was quite high, and that gene flow between populations is still occurring (Schwartz et al. 2005). Kit fox dispersal likely still maintains genetic variation throughout the range of the kit fox. Disruption of kit fox dispersal abilities through habitat loss, however, could result in an increase in inbreeding and a loss of genetic variation. These factors could increase the extinction risk for small, isolated populations of kit foxes by interacting with demography to reduce fecundity, juvenile survival, and lifespan (Lande 1988; Frankham and Ralls 1998; Saccheri et al. 1998).

Recovery Objectives

The San Joaquin kit fox is included in the Recovery Plan for Upland Species of the San Joaquin Valley, California (Service 1998a). The goals of the recovery plan are to initially downlist and ultimately delist the species. The decline of the San Joaquin kit fox is primarily caused by past and ongoing habitat loss, fragmentation, and degradation resulting from urban, agricultural, and other development. Shooting, trapping, poisoning, road kills, and competition with non-native species also have contributed to the species decline. The recovery plan identifies six key

processes for recovery of the San Joaquin kit fox: (1) achieving general recovery objectives, which include protecting occurrences and habitat of the species from development and other incompatible uses, developing and implementing habitat management plans, and achieving self-sustaining populations of kit foxes; (2) establishing a network of habitat conservation areas and reserves, (3) focusing conservation efforts on umbrella species (e.g., San Joaquin kit fox) and keystone species (e.g., giant kangaroo rat); (4) developing and implementing a monitoring and research program; (5) implementing adaptive management informed by research and monitoring; and (6) minimizing the economic and social cost of recovery actions.

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

1. The three core kit fox populations (Carrizo Natural Area, western Kern County, and Ciervo-Panoche Area) are secured and protected;

2. A management plan for each core area has been approved and is being implemented; and

3. Population monitoring indicates that the three core kit fox populations are stable or increasing, and population interchange is occurring between one or more core populations and satellite populations.

The San Joaquin kit fox may be considered for delisting when downlisting criteria have been met, in addition to the following conditions:

1. Several satellite kit fox populations are secured and protected;

2. Management plans for all protected areas have been approved and are being implemented; and

3. Population monitoring indicates that the kit fox populations in three or more satellite areas are stable or increasing.

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

5-Year Status Review

The Service completed a five-year status review for the San Joaquin kit fox in February 2010 (Service 2010a), which reported that the geographic range of the kit fox has changed little since the Recovery Plan was completed; however, the species' distribution is increasingly fragmented, abundance is low or fluctuates dramatically in known populations, some satellite subpopulations (e.g., Camp Roberts, Fort Hunter Liggett) appear to be extirpated, and portions of the range now appear to be frequented by dispersers rather than resident animals. The largest remaining kit fox population is in the Carrizo Plain, but the species' abundance appears to be below detection

levels in much of the rest of San Luis Obispo County. The 5-year review states that the largest threat to the kit fox remains the loss of habitat due to agricultural conversion, infrastructure construction, and urban development; while secondary threats include mineral extraction, wildfire frequency, non-native species, and incompatible grazing practices. Solar energy development is a new and potentially substantial threat that can eliminate suitable habitat or present obstacles to dispersal.

The primary conservation and recovery strategy for the San Joaquin kit fox is preservation of existing natural kit fox habitat, and over 150,000 acres were conserved between 1987 and 2007 through the section 7 and section 10 processes under the Act. In addition, several hundred thousand acres under Federal, State, or private ownership are, at least in part, managed to benefit the San Joaquin kit fox; although the kit fox appears to be absent from some of these areas. The 5-year review recommended that the Service maintain the species' endangered status, because the primary threats to the species are ongoing, the species has exhibited a continued decline, and the downlisting criteria have not been met.

The Service and cooperating public, nonprofit, and private stakeholders are working to conserve habitat by establishing preserves, conservation banks, and conservation easements. Threats to recovery of San Joaquin kit fox include loss of habitat to agricultural and urban development, effects of pesticide exposure, competitive exclusion by other canids, highly fluctuating population dynamics, isolation and loss of small subpopulations due to random events, habitat fragmentation, vehicle strikes, predation, and loss of prey.

Least Bell's Vireo

The Service listed the least Bell's vireo as endangered in 1986 (Service 1986), and critical habitat was designated in 1994 (Service 1994) with no areas in or near the action area. Although a final recovery plan has not been published, a draft recovery plan was completed in 1998 (Service 1998b). The Service issued a 5-year review in 2006 (Service 2006) in which we recommended downlisting to threatened status because of a 10-fold increase in population size since listing, expansion of locations with breeding pairs throughout southern California, and conservation and management of suitable breeding habitat throughout its range. Additional information on the least Bell's vireo may be found in Wilbur (1980), Garrett and Dunn (1981), Zembal et al. (1985), Miner (1989), Pike and Hays (1992), and Service (1998b).

The least Bell's vireo is a small, migratory songbird that nests and forages almost exclusively in riparian woodland. It is one of four recognized subspecies (AOU 1998), and each is isolated from another throughout the year (Hamilton 1962, Service 1998b). Least Bell's vireos are site-tenacious across breeding seasons and highly territorial. They typically inhabit structurally diverse woodlands along watercourses that feature dense cover within 0.9 to 1.8 m (3 to 6 ft) of the ground and a dense, stratified canopy (Goldwasser 1981, Salata 1983, Gray and Greaves 1984, Service 1998b). The understory of the habitat is typically dominated by mulefat (*Baccharis salicifolia*), California wild rose (*Rosa californica*), poison oak (*Toxicodendron diversiloba*), sandbar willow (*Salix hindsiana*), young individuals of other willow (*Salix*) species,

and several perennial species (Service 1998b). Important canopy species include mature arroyo willow (*Salix lasiolepis*) and black willow (*Salix gooddingii*), and occasional cottonwood (*Populus* spp.), western sycamore (*Platanus racemosa*e), and coast live oak (*Quercus agrifolia*). Least Bell's vireos feed primarily on insects, especially lepidopteran larvae within willow stands or associated riparian vegetation (Miner 1989, Brown 1993). The feeding behavior consists largely of gleaning prey from leaves or woody surfaces while perched or hovering, and less frequently by aerial pursuit (Salata 1983, Miner 1989). Least Bell's vireos concentrate most of their foraging between 0 to 6 m (20 ft) above ground level (Salata 1983, Miner 1989).

Least Bell's vireos generally arrive in breeding areas in southern California from mid-March to early April, with males arriving before females and older birds arriving before first-year breeders (Service 1998b). Least Bell's vireos generally remain on the breeding grounds until late September, although some post-breeding migration may begin as early as late July (Service 1998b). Males establish and defend breeding territories by singing and chasing intruders (Barlow 1962, Beck 1996, Service 1998b). Although territories typically range in size from 0.2 to 3.0 ha (0.5 to 7.5 ac; Service 1998b), no relationship appears to exist between size and quality of the territory (Newman 1992).

Nest building commences a few days after pair formation, with the female selecting a nest site and both sexes constructing the nest (Pitelka and Koestner 1942, Barlow 1962, Service 1998b). Nests are typically suspended in forked branches within 0.9 m (3 ft) above the ground and with no preference for any particular plant species as the nest host (Nolan 1960, Barlow 1962, Gray and Greaves 1984, Service 1998b). Typically 3 or 4 eggs are laid on successive days shortly after nest construction (Service 1998b). The eggs are incubated by both parents for approximately 14 days with the young remaining in the nest for another 10 to 12 days (Pitelka and Koestner 1942, Nolan 1960, Barlow 1962). Each nest appears to be used only once (Greaves 1987). Least Bell's vireos may attempt up to five nests within a breeding season, but they are typically limited to one or two successful nests within a breeding season (Service 1998b).

Multiple long-term monitoring studies indicate that approximately 59 percent of nests successfully produce fledglings, with an average of 1.8 chicks fledging per nest (Service 1998b). Although nests appear to be more accessible to terrestrial predators because of their relatively low placement (Franzreb 1989), western scrub-jays (*Aphelocoma californica*) account for the majority of documented depredation (Peterson 2002, Peterson et al. 2004). Predation rates can exceed 60 percent of the total nests in the area within a year (Kus 1999), but typical nest predation rates average around 30 percent (Franzreb 1989), which is comparable to predation rates for other North American passerines (Martin and Clobert 1996, Grishaver et al. 1998, Ferree 2002).

Nest parasitism by brown-headed cowbirds (*Molothrus ater*) is another major source of failure for nests of least Bell's vireos (Franzreb 1989; Service 1998b; Kus 1999, 2002; Griffith and Griffith 2000; Sharp 2002). The nests that are parasitized are either abandoned or fledge cowbird chicks rather than least Bell's vireos. It is believed that cowbirds did not historically

occur within the range of the least Bell's vireo, which may explain why least Bell's vireos have not evolved adequate defenses to avoid loss of productivity due to parasitism (Franzreb 1989, Kus 2002). Cowbird trapping and focused nest monitoring can substantially reduce parasitism and its effects (Franzreb 1989, Service 1998b, Griffith and Griffith 2000, Kus 2002). Cowbird trapping has proven a successful tool to halt least Bell's vireo population declines over the short term within a limited area, but Kus and Whitfield (2005) have argued that trapping may not be the best method for long-term recovery of the least Bell's vireo because maintaining cowbird populations at low levels may not allow the least Bell's vireo to evolve resistance to cowbird parasitism. It is unclear as to the best way to manage this threat over the long term, and additional research is needed to determine whether there are any alternatives to the intensive cowbird trapping programs currently being implemented (Service 2006).

Fledgling least Bell's vireos expand their dispersal distances from approximately 11 m (35 ft) the first day to approximately 61 m (200 ft) several weeks after fledging (Hensley 1950, Nolan 1960). This distance has been shown to increase to at least 1.6 km (1 mi) prior to their first fall migration (Gray and Greaves 1984). Banding records indicate that while most first-year breeding individuals return to their natal drainage after winter migration, some disperse considerable distances to other breeding locations (Greaves and Labinger 1997, Service 1998b, Kus and Beck 1998). Movement by least Bell's vireos between drainages within San Diego County is not uncommon (Kus and Beck 1998). Additionally, several least Bell's vireos banded as nestlings in San Diego County have been sighted as breeding adults in Ventura County, and the opposite movement from Ventura to San Diego has been observed also (Greaves and Labinger 1997). The maximum, documented dispersal distance is approximately 209 km (130 mi; Service 1998b). Although movement between sites by older birds may occur, site fidelity by least Bell's vireos after the first breeding season is generally high. Most dispersal occurs prior to the first breeding season (Service 1998b).

The least Bell's vireo historically occurred from Tehama County in northern California to northwestern Baja California, Mexico, and eastward to Owens Valley, Death Valley and the Mojave River (Grinnell and Miller 1944, Service 1998b). Although previously considered to be abundant locally, regional declines were observed by the 1940's (Grinnell and Miller 1944), and it was believed to be extirpated from California's Central Valley by the early 1980's (Franzreb 1989). Except for a few outlying pairs, by 2002 the least Bell's vireo was mostly restricted to southern California south of the Tehachapi Mountains and northwestern Baja California (Wilbur 1980, Garrett and Dunn 1981, Franzreb 1989, USGS 2002). The largest current concentrations of least Bell's vireos are in San Diego County along the Santa Margarita River on Camp Pendleton and in Riverside County at the Prado flood control basin (Service 2006).

Historically, the San Joaquin and Sacramento Valleys were considered to be the center of the least Bell's vireo's breeding range (60 to 80 percent of the historic population; Service 1986), but the least Bell's vireo has not yet meaningfully re-colonized those areas. In 2005 and 2006, the first breeding pair of least Bell's vireos detected in the San Joaquin Valley since listing successfully bred at the San Joaquin National Wildlife Refuge in Stanislaus County (Service 2006). There have been no sightings of least Bell's vireos in the Sacramento Valley since prior

to listing, and it is unlikely that breeding has occurred within recent years in the Sacramento Valley (Service 2006).

At the time of listing (Service 1986), 99 percent of the remaining least Bell's vireos were in southern California (Santa Barbara County and southward), with 77 percent in San Diego County. Ninety-nine percent still remain in southern California (Service 2006), although 54 percent are in San Diego County and 30 percent in Riverside County. Thus, despite a significant increase in overall numbers, the species remains mostly restricted to the southern portion of its historic range (Service 2006).

Causes for decline include destruction or degradation of habitat, river channelization, water diversions, lowered water tables, gravel mining, agricultural development, and cowbird parasitism (Service 1986, 1994, 1998b). Habitat losses have fragmented most remaining populations into small, disjunct, widely dispersed subpopulations (Franzreb 1989). Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds by increasing incidence of nest predation and parasitism (Whitcomb et al. 1981, Small and Hunter 1988, Yahner and DeLong 1992, Sharp 2002, Peterson 2002). Least Bell's vireos nesting in areas with much degraded habitat have lower productivity (e.g., hatching success) than those in areas with high quality habitat (Pike and Hays 1992).

Since listing, the least Bell's vireo population in California has increased 10-fold as indicated by the number of known territories (from 291 to 2,968 known territories; Service 2006). The population has grown during each 5-year period since listing, although the rate of increase has slowed over the last 10 years. Population growth has been greatest in San Diego County and Riverside County, with lesser but substantial increases in Orange County, Ventura County, San Bernardino County and Los Angeles County. The population in Santa Barbara County has declined since listing in 1986. Kern, San Luis Obispo, Monterey, San Benito and Stanislaus Counties have each had a few isolated individuals and/or breeding pairs since listing, but these counties have not supported sustained populations.

Recovery Objectives

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

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

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

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

5-Year Status Review

The Service completed a five-year status review for the least Bell's vireo in September 2006 (Service 2006). The 5-year review reported a 10-fold increase in the least Bell's vireo population since listing. Substantial increases occurred in San Diego County, Riverside County, Orange County, Ventura County, San Bernardino County, and Los Angeles County, while Santa Barbara County appears to have experienced a decline. The 5-year review reiterates that nest parasitism by the brown-headed cowbird is the most important threat to the least Bell's vireo. While acknowledging that the least Bell's vireo has not met the downlisting criteria from the draft recovery plan, the 5-year review determined that the sub-species is no longer in danger of extinction throughout all or a significant portion of its range, and recommended that the Service downlist the least Bell's vireo to threatened status.

California Red-legged Frog

The California red-legged frog was federally listed as threatened on May 23, 1996 (61 Federal Register (FR) 25813, Service 1996). Revised critical habitat for the California red-legged frog was designated on March 17, 2010 (75 FR 12816, Service 2010b). The Service issued a recovery plan for the species (Service 2002). A detailed description of California red-legged frogs can be found in Storer (1925), Stebbins (2003), and Jennings and Hayes (1994).

The historical range of the California red-legged frog extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Storer 1925, Jennings and Hayes 1985, Shaffer et al. 2004). The California red-legged frog has sustained a 70 percent reduction in its geographic range as a result of several factors acting singly or in combination (Davidson et al. 2001).

The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. California red-legged frogs have been found at elevations that range from sea level to about 5,000 feet. California red-legged frogs use the environment in a variety of ways, and in many cases they may complete their entire life cycle in a particular area without using other components (i.e., a pond is suitable for each life stage and use of upland habitat or a riparian corridor is not necessary). Populations appear to persist where a mosaic of habitat elements exists, embedded within a matrix of dispersal habitat. Adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (greater than 28 inches) still or slow-moving water; the largest summer densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). California red-legged frogs spend considerable time resting and feeding within dense riparian vegetation; it is believed the moisture and camouflage provided by the riparian plant community provide good foraging habitat and riparian vegetation provides cover during dispersal (Rathbun et al. 1993).

Breeding sites of the California red-legged frog are in aquatic habitats; larvae, juveniles, and adult frogs have been collected from streams, creeks, ponds, marshes, deep pools and backwaters within streams and creeks, dune ponds, lagoons, and estuaries. California red-legged frogs frequently breed in artificial impoundments such as stock ponds, given the proper management of hydro-period, pond structure, vegetative cover, and control of exotic predators. While frogs successfully breed in streams and riparian systems, high spring flows and cold temperatures in streams often make these sites risky egg and tadpole environments. An important factor influencing the suitability of aquatic breeding sites is the general lack of introduced aquatic predators. When riparian vegetation is present, California red-legged frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community likely provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting population numbers and distribution.

During periods of wet weather, starting with the first rains of fall, some individual California red-legged frogs may make long-distance overland excursions through upland habitats to reach breeding sites. In Santa Cruz County, Bulger et al. (2003) found marked California red-legged frogs moving up to 1.7 miles through upland habitats, via point-to-point, straight-line migrations without apparent regard to topography, rather than following riparian corridors. Most of these overland movements occurred at night and took up to 2 months. Similarly, in San Luis Obispo County, Rathbun and Schneider (2001) documented the movement of a male California red-legged frog between two ponds that were 1.78 miles apart; this was accomplished in less than 32 days. However, most California red-legged frogs in the Bulger et al. (2003) study were non-migrating frogs and always remained within 426 feet of their aquatic site of residence (half of the frogs always stayed within 82 feet of water). Rathbun et al. (1993) radio tracked several California red-legged frogs near the coast in San Luis Obispo County at various times between July and January; these frogs also stayed rather close to water and never strayed more than 85 feet into upland vegetation. Nine California red-legged frogs radio-tracked from January to June

2001, in East Las Virgenes Creek in Ventura County remained relatively sedentary as well; the longest within-channel movement was 280 feet and the furthest movement away from the stream was 30 feet (Scott 2002). Hayes and Tennant (1985) found juveniles to be active diurnally and nocturnally, whereas adults were largely nocturnal.

After breeding, California red-legged frogs often disperse from their breeding habitat to forage and seek suitable dry-season habitat. Cover within dry-season aquatic habitat could include boulders; downed trees; logs; agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks; and industrial debris. California red-legged frogs use small mammal burrows and moist leaf litter (Rathbun et al. 1993, Jennings and Hayes 1994); incised stream channels with portions narrower and deeper than 18 inches may also provide habitat (61 FR 25813). This type of dispersal and habitat use, however, is not observed in all California red-legged frogs and is most likely dependent on the year-to-year variations in climate and habitat suitability and varying requisites per life stage. For the California red-legged frog, this habitat is potentially all aquatic and riparian areas within the range of the species and includes any landscape features that provide cover and moisture (61 FR 25813).

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 1.6 feet, riparian shrubbery, and emergent vegetation (Jennings and Hayes 1985), there are numerous locations in the species' historical range where these elements are well represented yet California red-legged frogs appear to be absent. The cause of local extirpations does not appear to be restricted solely to loss of aquatic habitat. The most likely causes of local extirpation are thought to be changes in faunal composition of aquatic ecosystems (i.e., the introduction of non-native predators and competitors) and landscape-scale disturbances that disrupt California red-legged frog population processes, such as dispersal and colonization. The introduction of contaminants or changes in water temperature may also play a role in local extirpations. These changes may also promote the spread of predators, competitors, parasites, and diseases.

Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, Hayes and Jennings 1988). Habitat loss and degradation, combined with over-exploitation and introduction of exotic predators, were important factors in the decline of the California red-legged frog in the early to mid-1900s. Continuing threats to the California red-legged frog include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, competition or predation from non-native species including the bullfrog (*Rana catesbeiana*), catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquitofish (*Gambusia affinis*), red swamp crayfish (*Procambarus clarkii*), and signal crayfish (*Pacifastacus leniusculus*). Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations, and is considered a threat to California red-legged frog populations.

Recovery Objectives

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

1. Suitable habitats within all core areas are protected and/or managed for California red-legged frogs in perpetuity, and the ecological integrity of these areas is not threatened by adverse anthropogenic habitat modification (including indirect effects of upstream/downstream land uses);

2. Existing populations throughout the range are stable (i.e., reproductive rates allow for long-term viability without human intervention). Population status will be documented through establishment and implementation of a scientifically acceptable population monitoring program for at least a 15-year period, which is approximately 4 to 5 generations of the California red-legged frog. This 15-year period will preferably include an average precipitation cycle;

3. Populations are geographically distributed in a manner that allows for the continued existence of viable metapopulations despite fluctuations in the status of individual populations (i.e., when populations are stable or increasing at each core area);

4. The species is successfully reestablished in portions of its historic range such that at least one reestablished population is stable/increasing at each core area where California red-legged frog are currently absent; and

5. The amount of additional habitat needed for population connectivity, recolonization, and dispersal has been determined, protected, and managed for California red-legged frogs.

The recovery plan identifies eight recovery units, which are based on the assumption that various regional areas of the species' range are essential to its survival and recovery. The status of this species is considered within the smaller scale of recovery units as opposed to the overall range. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of the range of the California red-legged frog. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit.

Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will allow for long term viability within existing populations. This management strategy will allow for the recolonization of habitat within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

California Tiger Salamander

The Service recognizes three distinct population segments (DPS) of the California tiger salamander: one in Sonoma County; one in northern Santa Barbara County; and one in central California, which represents the DPS under consideration in this biological opinion. On September 21, 2000, the Service listed the Santa Barbara County DPS of the California tiger salamander as endangered (Service 2000). On March 19, 2003, the Service listed the Sonoma County DPS of the California tiger salamander as endangered (Service 2003a). On August 4, 2004, the Service published a final rule listing the California tiger salamander as threatened range-wide, including the previously identified Sonoma and Santa Barbara DPS (Service 2004). On August 19, 2005, U.S. District Judge William Alsup vacated the Service's downlisting of the Sonoma and Santa Barbara populations from endangered to threatened. Thus, the Sonoma and Santa Barbara populations are listed as endangered, and the central California population is listed as threatened.

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

The California tiger salamander is a large and stocky terrestrial salamander with small eyes and a broad, rounded snout. Adults may reach a total length of 8.2 inches, with males generally averaging about 8 inches total length, and females averaging about 6.8 inches in total length. For both sexes, the average snout-to-vent length is approximately 3.6 inches (Service 2000). The eyes have black irises and protrude from the head. Coloration consists of white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black. Males can be distinguished from females, especially during the breeding season, by their swollen cloacae (a common chamber into which the intestinal, urinary, and reproductive canals discharge), larger tails, and larger overall size (Loredo and Van Vuren 1996).

Historically, natural ephemeral vernal pools were the primary breeding habitats for California tiger salamanders (Twitty 1941, Fisher and Shaffer 1996, Petranka 1998). However, with the conversion and loss of many vernal pools through farmland conversion and urban and suburban

development, ephemeral and permanent ponds that have been created for livestock watering are now frequently used by the species (Fisher and Shaffer 1996, Robins and Vollmar 2002).

California tiger salamanders spend the majority of their lives in upland habitats and cannot persist without them (Trenham and Shaffer 2005). The upland component of California tiger salamander habitat typically consists of grassland savannah, but includes grasslands with scattered oak trees, and scrub or chaparral habitats (Shaffer et al. 1993, Service 2000). Juvenile and adult California tiger salamanders spend the dry summer and fall months of the year in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925, Loredo and Van Vuren 1996, Trenham 1998). Burrow habitat created by ground squirrels and utilized by California tiger salamanders suggests a commensal relationship between the two species (Loredo et al. 1996). Movement of California tiger salamanders within and among burrow systems continues for at least several months after juveniles and adults leave the ponds (Trenham 2001). California tiger salamanders cannot dig their own burrows, and as a result, their presence is associated with burrowing mammals (Seymour and Westphal 1994). Active ground-burrowing rodent populations likely are required to sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time (Service 2004). Loredo et al. (1996) found that California ground squirrel burrow systems collapsed within 18 months following abandonment by, or loss of, the mammals.

California tiger salamanders have been found in upland habitats various distances from aquatic breeding habitats. In a trapping study in Contra Costa County, California tiger salamanders were trapped approximately 2,625 feet to 3,940 feet away from potential breeding habitat (Service 2004). During a mark and recapture study in the Upper Carmel River Valley in Monterey County, Trenham et al. (2001) observed California tiger salamanders dispersing up to 2,200 feet between breeding ponds between years. In research at Olcott Lake in Solano County, Trenham and Shaffer (2005) captured California tiger salamanders in traps installed 1,312 feet from the breeding pond. A followup trapping and modeling study at Olcott Lake and nearby Round Pond by Searcy et al. (2013) indicated that density of California tiger salamanders generally decreased with distance from the breeding pond and that 95% of the population would be found within 6070 feet (1.15 miles).

Adults enter breeding ponds during fall and winter rains, typically from October through February (Storer 1925, Loredo and Van Vuren 1996, Trenham et al. 2000). Males migrate to the breeding ponds before females (Twitty 1941, Shaffer et al. 1993, Loredo and Van Vuren 1996, Trenham 1998). Males usually remain in the ponds for an average of about 6 to 8 weeks, while females stay for approximately 1 to 2 weeks. In dry years, both sexes may stay for shorter periods (Loredo and Van Vuren 1996, Trenham 1998).

Females attach their eggs singly or, in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris in the water (Storer 1925, Twitty 1941). In ponds with little or no vegetation, females may attach eggs to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). In drought years, the seasonal pools may not form and the adults may not breed (Barry and Shaffer 1994). The eggs hatch in 10 to 14 days with newly hatched

salamanders (larvae) ranging in size from 0.5 to 0.6 inch in total length (Petranka 1998). The larvae are aquatic. Each is yellowish gray in color and has a broad, plump head; large, feathery external gills; and broad dorsal fins that extend well onto its back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about 6 weeks after hatching, after which they switch to larger prey (Anderson 1968). Larger larvae have been known to consume smaller tadpoles of tree frogs (*Pseudacris* spp.) and California red-legged frogs (*Rana draytonii*) (Anderson 1968). California tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems.

The larval stage of the California tiger salamander usually lasts 3 to 6 months, because most seasonal ponds and pools dry up during the summer (Petranka 1998). Amphibian larvae must grow to a critical minimum body size before they can metamorphose to the terrestrial stage (Wilbur and Collins 1973). Larvae collected near Stockton in the Central Valley during April varied from 1.9 to 2.3 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the inundation period, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Semlitsch et al. 1988, Pechmann et al. 2001). The larvae perish if a site dries before they complete metamorphosis (Anderson 1968, Feaver 1971). Pechmann et al. (2001) found a strong positive correlation between inundation period and total number of metamorphosing juvenile amphibians, including tiger salamanders.

Metamorphosed juveniles leave the breeding sites in the late spring or early summer. Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925, Shaffer et al. 1993) before settling in their selected upland sites for the dry, hot summer months. While most California tiger salamanders rely on rodent burrows for shelter, some individuals may utilize soil crevices as temporary shelter during upland migrations (Loredo et al. 1996). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998). Emergence from upland habitat in hot, dry weather occasionally results in mass mortality of juveniles (Holland et al. 1990).

We do not have data regarding the absolute number of California tiger salamanders, because they spend most of their lives underground. Virtually nothing is known concerning the historical abundance of the species. At one study site in Monterey County, Trenham et al. (2000) found the number of breeding adults visiting a pond varied from 57 to 244 individuals. A Contra Costa County breeding site approximately 124 miles north of the Trenham et al. (2000) study site in Monterey County showed a similar pattern of variation, suggesting that such fluctuations are typical (Loredo and Van Vuren 1996). At the local landscape level, nearby breeding ponds can vary by at least an order of magnitude in the number of individuals visiting a pond, and these differences appear to be stable across adjacent ponds over time (Trenham et al. 2001).

Lifetime reproductive success for California tiger salamanders is typically low. Less than 50 percent breed more than once (Trenham et al. 2000). In part, this is due to the extended length of time it takes for California tiger salamanders to reach sexual maturity; most do not breed until 4

or 5 years of age. Combined with low survivorship of metamorphs [in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998)], low reproductive success limits California tiger salamander populations. Because of this low recruitment, isolated subpopulations can decline greatly from unusual, randomly occurring natural events as well as from human-caused factors that reduce breeding success and individual survival. Based on metapopulation theory (Hanski and Gilpin 1991), factors that repeatedly lower breeding success in isolated ponds that are too far from other ponds for migrating individuals to replenish the population further threaten the survival of a local population.

The California tiger salamander is threatened primarily by the destruction, degradation, and fragmentation of upland and aquatic habitats, primarily resulting from the conversion of these habitats by urban, commercial, and intensive agricultural activities (Service 2000; 2003a; 2004). Additional threats to the species include hybridization with introduced nonnative barred tiger salamanders (*A. tigrinum mavortium*) (Service 2000, 2004), destructive rodent-control techniques (e.g., deep-ripping of burrow areas, use of fumigants) (Service 2003a), reduced survival due to the presence of mosquitofish (*Gambusia affinis*) (Leyse and Lawlor 2000), and mortality on roads due to vehicles (Service 2000). Disease, particularly chytridiomycosis and ranaviruses, and the spread of disease by nonnative amphibians, are discussed in the listing rule as an additional threat to the species (Service 2004).

Recovery Objectives

The Service has completed a draft recovery plan for the central California DPS of the California tiger salamander (Service 2016). The stated the goal of the plan is to reduce the threats to the central California tiger salamander to ensure its long-term viability in the wild and allow for its removal from the list of threatened and endangered species. The recovery objectives of the plan are to: (1) permanently protect the habitat of self-sustaining populations of the central California tiger salamander throughout the full range of the DPS, ensuring conservation of genetic variability and diverse habitat types (*e.g.*, across elevation and precipitation gradients); (2) ameliorate or eliminate the threats that caused the species to be listed, and any future threats; and (3) restore and conserve a healthy ecosystem supportive of central California tiger salamander populations.

The species will be considered for delisting when:

1. The threat of habitat loss is ameliorated or eliminated to an extent that it is no longer a threat to central California tiger salamander populations. This will be accomplished through habitat preservation (in fee title or easement). The number and size of preserves and the amount of breeding and upland habitat within preserves required for recovery within each recovery unit and management subunit are specified in recovery criteria A/1 through A/4;

2. The threat of disease and predation is controlled or eliminated. This will be accomplished through the following recovery criteria: reduce the potential that ranaviruses or other pathogens are introduced to central California tiger salamander populations (C/1); ensure early detection of ranaviruses and other pathogens if they are introduced to central California tiger salamander populations in the future (C/2); and ensure that threats to the central California tiger salamander

from predation are controlled or ameliorated to an extent they are not a threat to Central California tiger salamander populations; and

3. Other natural or manmade threats including mortality from road crossings, hybridization with non-native tiger salamanders, contaminants, mosquito control efforts, livestock grazing, and climate change are ameliorated or eliminated. This will be accomplished through the following recovery criteria: all central California tiger salamander populations on protected lands counted toward recovery are native and show no evidence of hybrid genes for at least 26 years (approximately two central California tiger salamander lifespans), and no known hybrids are within dispersal distance (1.3 miles) of these protected populations, unless significant barriers to dispersal are present (E/1); ensure that effects to the central California tiger salamander from contaminants are controlled or ameliorated to an extent they are not a threat to central California tiger salamander populations (E/2); ensure that effects to the central California tiger salamander from road mortality are controlled or ameliorated to an extent they are not a threat to the central California tiger salamander populations (E/3); each preserve counted toward recovery has site-specific management plans to maintain habitat suitability in perpetuity and monitor for threats (E/4); central California tiger salamander populations occur throughout the current geographic and elevational range of the DPS to maximize their ability to adapt to changing air temperature, ponding duration, and other factors in light of future climate change (E/5); and Criteria A/1 through A/4 have been met, and monitoring of central California tiger salamander breeding habitat has resulted in each preserve having at least a minimum effective population size of 132 individuals over a 26 year period (E/6).

The range of the central California tiger salamander has been classified into four recovery units. These recovery units are not regulatory in nature; the boundaries of the recovery units do not identify individual properties that require protection, but they are described solely to facilitate recovery and management decisions. The recovery units represent both the potential extent of central California tiger salamander habitat within the species' range and the biologically (genetically) distinct areas where recovery actions should take place that will eliminate or ameliorate threats. Each recovery unit is further subdivided into management units. Management units represent areas that might require different management, that might be managed by different entities, or that might encompass different populations. In the recovery plan, the management units are primarily administrative in that they serve to organize the recovery units into separate and approximately equal areas that will assist in managing the implementation of the recovery actions. Specific recovery targets for each recovery and management unit, including target numbers of preserves and required total acreage to be preserved, are defined in the draft recovery plan (Service 2016).

5-Year Status Review

The Service completed a five-year status review for the California tiger salamander central California population in October 2014 (Service 2014), which affirmed the central population as a distinct DPS based on recent range-wide genetic analysis. The review reported an increase in the number of known central California tiger salamander occurrences since the time of listing, but emphasized that the increase may be due to greater survey efforts associated with proposed development projects and not necessarily indicate that the species is recovering or expanding its

range. The 5-year review states that all populations of the central California tiger salamander continue to face the same threats known at the time of listing.

Loss and fragmentation of vernal pool complexes by urban development and agricultural conversion, including replacement of compatible grazing uses with vineyards, row crops, and development continue to threaten the species. The 5-year review describes approximately 8,000 acres of potential habitat lost to urban and agricultural uses from 2001 to 2006, and that since the time of listing, approximately 8,656 acres of permanent habitat loss has been exempted through section 7 of the Act while incidental take permits associated with HCPs have permitted the loss of over 25,000 acres of potential habitat. The review reports that 7,993 acres of habitat have been permanently protected as conservation banks, and multiple public and private lands protect known occurrences of the California tiger salamander and large, intact areas of suitable habitat. The occupancy status of many of these protected lands is unknown however, and some are managed for other uses in addition to protecting California tiger salamanders.

Hybridization with non-native tiger salamanders continues to be a primary threat to the central California population. The 5-year review indicates that because non-native tiger salamander alleles dominate in perennial ponds, specific life history traits of non-native tiger salamanders may give them an advantage to persist in these habitats. Other threats including predation from non-native species, exposure to contaminants, and mortality from road crossings appear to be at similar levels to what was known at the time of listing, while the impact of small mammal eradication and mosquito abatement programs on central California tiger salamander populations and any changes in these threats remain difficult to determine.

The 5-year review recommended no change in listing status for the central California tiger salamander and that the species should remain listed as threatened. Conservation recommendations in the review include completion of a recovery plan; establishment of preserve areas with sufficient breeding and upland habitat for long-term persistence; creation, restoration, and active management of habitats including removal and control of non-native predators; education and outreach efforts with conservation partners and landowners; strategies to identify and limit hybridization with non-native tiger salamanders; and use of crossing structures to reduce road-kill mortality during migration to and from breeding ponds.

Critical Habitat for the California Tiger Salamander

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

All of the areas of critical habitat for the California tiger salamander are within the species' historical geographic range and contain primary constituent elements (PCEs) to support at least one of the California tiger salamander's essential life history functions. Based on our current

knowledge of the life-history, biology, and ecology of the California tiger salamander, we determined that the PCEs of California tiger salamander critical habitat consist of:

1. Standing bodies of fresh water (including natural and manmade (*e.g.*, stock)) ponds, vernal pools, and other ephemeral or permanent water bodies which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall.

2. Upland habitats adjacent to and accessible from breeding ponds that contain small mammal burrows or other underground habitat that California tiger salamanders depend upon for food, shelter, and protection from the elements and predation.

3. Accessible upland dispersal habitat between occupied locations that allow for movement between such sites.

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

ENVIRONMENTAL BASELINE

Action Area

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 Code of Federal Regulations 402.02). The action area for this biological opinion is the approximately 1,500-foot long section of San Felipe Pipeline Road/Levee encompassing the culverts to be replaced; areas of pasture and wetland immediately adjacent to the levee; the portion of Tequisquita Slough to be potentially dewatered at Station 86+80 and the downstream discharge point; the 100-foot by 200-foot staging and storage area; the existing access road; and a 50-foot buffer around all areas of ground disturbance within which small mammal burrows may be affected. A total of approximately 2.5 acres would be temporarily directly affected by the project including the 50-foot buffer. To address potential indirect effects to listed species from increased vibration, noise, dust, human presence, and other factors associated with project activities, an additional 500-foot buffer was added. This greater buffer distance defines a larger action area than is described in the Biological Assessment (Reclamation 2015).

Habitat Characteristics of the Action Area

Habitat in the action area includes bare disturbed ground, gravel road, non-native annual grassland, a small stream which may be ephemeral or perennial depending on annual conditions, small erosional ponds at the outlet side of individual culverts that may hold water through the summer in wet years, a small mixed stand of oaks and willows outside of the area of direct ground disturbance, and limited riparian and emergent wetland vegetation including sedges, rushes, *Typha*, and willows. The extent of aquatic and riparian habitat features and the degree of connectivity among aquatic habitats may vary considerably within and between years due to changes in precipitation and local water use and their effect on the water table. The extent and condition of habitats may also be influenced by ongoing cattle grazing (see below).

Existing Conditions in the Action Area

The action area is in a flat valley at the base of the Diablo Range south of Highway 152. Land use in the project vicinity is dominated by cultivated fields and grasslands grazed by cattle, while ranchlands along Hwy 152 in the foothills further north include stock ponds identified previously as California tiger salamander breeding localities (CNDDB 2015).

Just north of the action area is San Felipe Lake, a shallow, turbid sag pond formed by the Calaveras Fault zone that typically retains some water through the summer; the area surrounding San Felipe Pipeline Road/Levee may be considered a southern seasonal portion of the lake. The grazed fields adjacent to San Felipe Road/Levee exhibit a high water table through the dry season, which may help maintain water and wetland vegetation year-round in the erosional ponds north of the levee culverts and in Tequisquita Slough (Smith 2005, Reclamation 2015). Tequisquita Slough is shallow with a silty bottom and supports riparian vegetation including small stands of willows. A series of wetlands and sag ponds associated with the Calaveras Fault are found further south within 0.1 to 1.0 miles of the action area. Pacheco Creek passes approximately 0.25 miles to the east and north of the action area where it supports a dense riparian forest of willows (*Salix* spp.) and box elders (*Acer negundo*) before and where it empties into San Felipe Lake.

Small mammal burrows have been observed along the face of the levee berm, near the proposed staging area, and in the adjacent grazed fields, though the high water table may limit fossorial mammal populations in lower-lying areas adjacent to the levee (SCVWD 2011, HTH 2012). Non-native fish, crayfish, and bullfrogs have been observed repeatedly during aquatic sampling of Tequisquita Slough, San Felipe Lake, and the erosional ponds adjacent to the levee (Rana Resources 2003, Smith 2005, HTH 2012, B. Sanderson, pers. comm.).

Status of the Species in the Action Area

Information to develop this section includes CNDDB records, reports submitted to the Service, published literature, and surveys completed specifically for this project. A complete description

of the survey methods utilized for this project can be found in the biological assessment and its appendices (Reclamation 2015).

San Joaquin kit fox

San Joaquin kit fox are wide-ranging and known to occur in northern San Benito County (Service 1998a, 2010a, CNDDB 2015). While the action area is near the limit of the species' current known range, San Joaquin kit fox have been observed within 6 miles (CNDDB 2013, as cited in Reclamation 2015). Eight occurrences have been recorded within 15 miles of the action area, most recently in 1992 approximately 11 miles south near the City of Hollister and in 2002 approximately 12 miles northeast at Henry Coe State Park (CNDDB 2015). San Joaquin kit fox have not been observed in the action area. Protocol surveys conducted within and adjacent to portions of the action area for previous repair and maintenance projects in 2003 and 2011 found no burrows or dens or other evidence of use by San Joaquin kit fox (Rana Resources 2003, SCVWD 2011). Ground squirrel and gopher burrows providing potential denning locations have been observed along the face of the levee berm and are presumed to occur in adjacent grassland areas (HTH 2012), and high quality foraging habitat is present (Service 2003b). Agricultural and grazing lands surrounding the action area provide dispersal habitat and Highway 152 to the north is the only major potential movement barrier, thus dispersing San Joaquin kit foxes could enter the area from other localities. There is thus the potential for the San Joaquin kit fox to occur in the action area, but we anticipate the probability to be low.

Recovery

The action area lies outside of designated recovery or linkage areas for the San Joaquin kit fox (Service 1998a, 2010a), the nearest being Satellite Recovery Area S2, Western Merced and Stanislaus Counties, approximately 20 miles to the east. Threats to the species have reduced the quality of kit fox habitat and the amount of resources available to the species in San Benito County. San Joaquin kit foxes occurring in the vicinity of the action area are subject to direct and indirect effects of human activities including roads and vehicles, rodenticide, and habitat loss and fragmentation due to agriculture expansion. The species is also affected by increased numbers of native and non-native predators and competitors (e.g., coyote, red fox).

Least Bell's vireo

The action area is located within the historic range of the least Bell's vireo. The species has been observed in the project vicinity, including 2001 breeding records from Llagas Creek approximately 3 miles west of the action area and from near San Juan Bautista approximately 16 miles southwest of the action area (CNDDB 2015). Surveys conducted within and adjacent to portions of the action area in September 2003 did not identify suitable breeding habitat for least Bell's vireos (Rana Resources 2003), and no individuals have been detected during periodic visits by SCVWD biologists since 2003 though protocol surveys do not appear to have been conducted during these visits (Reclamation 2015). The area of proposed direct project impacts does not include suitable least Bell's vireo breeding habitat. Approximately 2 acres of riparian

vegetation found within 200 feet of the area of ground disturbance provides marginal breeding and foraging habitat. A more suitable corridor of dense willow and alder is found outside of the action area, as close as 0.25 miles to the north and east along San Felipe Lake and Pacheco Creek. Least Bell's vireo numbers have increased 10-fold overall since their listing as endangered in 1996, and the species is re-colonizing previously occupied habitat and being found in previously undocumented locations (Service 2006). There is thus the potential for the least Bell's vireo to occur in the action area, but we anticipate the probability to be low given limited habitat.

Recovery

The action area lies outside of currently and historically occupied sites for which recovery targets were established in the draft recovery plan (Service 1998b); the nearest site designated for recovery is the currently unoccupied Salinas River approximately 30 miles to the southwest (Delisting Criterion 2). The draft recovery plan emphasizes the conservation and management of riparian habitat within the historical range of the least Bell's vireo, including the reduction of threats from cowbird parasitism and invasion by exotic plants. The action area provides a small area of suitable habitat for least Bell's vireos and is not expected to play a major role in its overall recovery. However, if least Bell's vireos were found in or adjacent to the action area this would represent further evidence of the species' recolonization of its historic range and overall recovery, and the area could serve to link other nearby sites isolated by prior loss and fragmentation of habitat should they become re-occupied in the future.

California red-legged frog

The action area is located within the current range of the California red-legged frog, with the nearest known locality approximately 2 miles south of the action area and three additional localities found within approximately 5 miles (Reclamation 2015). Daytime visual surveys of aquatic habitats within and adjacent to the action area in September 2003 did not find evidence of any life stages of California red-legged frogs (Rana Resources 2003). Protocol surveys for California tiger salamanders conducted in 2012 detected no California red-legged frogs in nine small erosional ponds north of the levee berm (HTH 2012). However, potential predators including non-native fish, crayfish, and bullfrogs were observed during these and other surveys of aquatic features in the action area and San Felipe Lake (Rana Resources 2003, Smith 2005, HTH 2012).

Aquatic breeding and non-breeding habitat is present within the action area in Tequisquita Slough and small erosional ponds north of the levee berm, and in the project vicinity in San Felipe Lake, Pacheco Creek, and other wetlands. The suitability of these features for breeding may be limited by the presence of non-native predators, though California red-legged frog adults and tadpoles have been observed in the presence of aquatic predators at some locations (Service 2002). Upland non-breeding habitat in the action area includes riparian vegetation, small mammal burrows, and potentially spaces within soil and between rocks in the levee berm. Any portion of the action area may serve as dispersal habitat for California red-legged frogs, which

may travel over 2 miles to and from breeding sites across both natural and human-altered habitats including gravel roads and disturbed areas. Major barriers (e.g. urban development, high-traffic roads) which could prevent dispersing frogs from entering the action area are largely absent in the surrounding landscape. There is thus the potential for adult California red-legged frogs to occur within the action area though probably in low numbers if they do, and a smaller likelihood that other life stages may be present; the likelihood of encountering any life stage of the species would be greater during the wet season.

Recovery

The action area is within the Diablo Range and Salinas Valley Recovery Unit (Recovery Unit 6) described in the recovery plan for the California red-legged frog (Service 2002). The action area is within and near the northern boundary of the Santa Clara Valley Core Recovery Area (Core Area 17) within the Diablo Range and Salinas Valley Recovery Unit. Core areas are locations targeted for development and implementation of management and protection plans for the California red-legged frog. Conservation needs identified for the Santa Clara Valley Core Area include: protect existing populations; control non-native predators; study effects of grazing in riparian corridors, ponds, and uplands; reduce impacts associated with livestock grazing; protect habitat connectivity; minimize effects of recreation and off-road vehicle use; avoid and reduce impacts of urbanization; and protect habitat buffers from nearby urbanization.

California tiger salamander

The action area is located within the current range of the California tiger salamander, and there are multiple known breeding localities to the north and east (CNDDB 2015). The nearest locality is approximately 0.75 miles north of the action area and nine additional localities are found within approximately 5 miles (HTH 2012, Reclamation 2015); all but one are found just north of Highway 152 at cattle ponds within grassland and valley oak habitat. Daytime visual surveys of aquatic habitats within and adjacent to the action area in September 2003 found no evidence of any life stages of the California tiger salamander (Rana Resources 2003). Protocol larval surveys for California tiger salamanders following the joint Service-CDFG guidance (Service 2003c) were conducted in the action area at nine erosional ponds on the north side of the levee berm on three dates from March-May 2012 and no California tiger salamanders of any life stage were found, though precipitation for the preceding rainy season was described as being below-average (HTH 2012). Various potential predators including non-native fish, crayfish, and bullfrogs were observed during these and other surveys of aquatic features in and adjacent to the action area and in San Felipe Lake (Rana Resources 2003, Smith 2005, HTH 2012).

Aquatic breeding habitat is present within the action area in the small erosional ponds associated with each culvert, and potentially at other unidentified pools in the vicinity (HTH 2012). The suitability of these features for breeding may be reduced due to the presence of aquatic predators, their long hydroperiod under some conditions, and periodic connectivity of the ponds with perennial San Felipe Lake where predator populations are presumably more stable. Upland non-breeding habitat in the action area includes scattered ground squirrel and gopher burrows (HTH

2012) and potentially spaces within soil and between rocks in the levee berm. The action area is free of major barriers and may serve as dispersal habitat for California tiger salamanders, which have been observed to disperse as much as 1.3 miles from breeding sites in some locations. Highway 152 may limit dispersal into the action area from the nearest known breeding site to the north and the density of dispersing salamanders would be expected to decrease with distance from this pond (Searcy et al. 2013), though salamanders could also enter the action area from unidentified breeding sites south of this road. There is thus the potential for adult California tiger salamanders to occur within the action area though probably in low numbers if they do, and a smaller likelihood that other life stages may be present; the likelihood of encountering any life stage of the species would be greater during the wet season.

Recovery

The action area is within the Bay Area Recovery Unit, and within and near the northern boundary of the Southwest Diablo Management Unit within this Recovery Unit, described in the draft recovery plan for the central California tiger salamander (Service 2016). This recovery unit has a high degree of habitat protection relative to the other recovery units. However, the majority of populations within this recovery unit have not been monitored for population status, trends, and threats. Hybridization with non-native tiger salamanders is a threat to some populations within this recovery unit (Service 2004). A principal goal for the Bay Area Recovery Unit is the protection of sufficient high quality habitat within all of its constituent management units to ensure sustainable central California tiger salamander populations (recovery criterion A/3). Specific protection targets for the 551,730-acre Southwest Diablo Management Unit are the creation of 5 preserves totaling at least 16, 990 acres. Other conservation needs identified for this and other recovery and management units include reducing or eliminating threats posed by disease, predation, road-crossing mortality, contaminants, mosquito control efforts, some livestock grazing practices, and climate change.

California tiger salamander critical habitat

The action area, except for the proposed staging area and part of the access road, is within the San Felipe Unit (Unit EB-12) of critical habitat for the California tiger salamander. The unit includes 6,642 acres of privately owned land and is essential to the conservation of the species, because it is needed to maintain the current geographic and ecological distribution of the species within the East Bay Geographic Region. The area of proposed ground disturbance in the action area is approximately 2.5 acres, which represents a small portion (.04%) of Unit EB-12. Unit EB-12 represents part of the center of the species' distribution within the East Bay Geographic Region, is located in the center of the Central Coast vernal pool region, and contains all three of the PCE's and ten extant occurrences of the species. It is generally found west of Camadero, south of Kickham Peak, east of San Joaquin Peak, and north of Dunneville. Threats include erosion and sedimentation, pesticide application, introduction of non-native predators such as bullfrogs and mosquito fish, disturbance activities associated with development that may alter the hydrologic functioning of aquatic habitat, upland disturbance activities that may alter upland

refugia and dispersal habitat, and activities such as road development and widening that may create barriers for dispersal.

Aquatic breeding habitat holding water for 12 weeks or greater (PCE 1) in the action area includes Tequisquita Slough and small erosional ponds on the north side of the levee associated with each culvert, which may be ephemeral or perennial in different years. Previous observations of introduced aquatic predators in these features and in San Felipe Lake, their long hydroperiod under some conditions which may sustain predator populations, and periodic connectivity of aquatic habitats in the action area to San Felipe Lake suggest that PCE 1 has been negatively impacted locally. Upland habitat including scattered small mammal burrows and potentially spaces in soil and anchor rock in the levee berm (PCE 2) is present in the action area and adjacent habitats. The extent and availability of PCE 2 in lower-lying areas adjacent to the berm may vary with precipitation, regional groundwater use, the resulting height of the local water table, and changes in fossorial mammal populations. Accessible upland dispersal habitat (PCE 3) is present in the action area and the surrounding pastures, though Highway 152 may reduce the extent to which California tiger salamanders are able to disperse into the action area from known breeding ponds to the north.

EFFECTS OF THE ACTION

San Joaquin kit fox

San Joaquin kit foxes have not been previously observed in the action area and the project site is near the limit of the species' current known range, but suitable habitat is present. We anticipate proposed construction activities to result in temporary or permanent direct impacts to approximately 2.38 acres of suitable habitat for the San Joaquin kit fox, including a 50-foot buffer around the area of ground disturbance and excluding wetland areas. Temporary indirect impacts from disturbance to San Joaquin kit fox using habitat in the action area outside of but adjacent to areas of ground disturbance could also occur. We expect that these temporary impacts would be reduced with implementation of the proposed conservation measures.

Construction activities such as staging, grading, excavation, and soil compaction are likely to result in temporary or permanent impacts to suitable San Joaquin kit fox habitat. Potential dens may be damaged by project-related filling or grading activities. Implementation of the proposed conservation measures to avoid and minimize temporary and permanent effects to the San Joaquin kit fox, including adherence to the Service's Standardized Recommendations for Protection of the San Joaquin kit fox (Service 2011) and halting work if any San Joaquin kit foxes are seen in the action area, would minimize these impacts.

Construction activities in the action area could result in disturbance, injury, or mortality to San Joaquin kit foxes caused by movement of equipment or vehicles, construction debris, and worker foot traffic. Work activities and associated noise and vibration may cause San Joaquin kit foxes to avoid or leave the work site and surrounding areas, and displace them into adjacent areas where they could experience increased exposure, starvation, or stress through disorientation;

reduced fitness; and intra- and inter-specific competition. This disturbance and displacement could also result in increased exposure of San Joaquin kit fox to predators such as coyote (*Canis latrans*) and red fox (*Vulpes vulpes*), and may increase the potential for vehicle strikes on roadways. Preconstruction surveys to identify and demarcate potential dens or other refugia in and around surrounding work areas by a Service-approved biologist, minimization of nighttime vehicle traffic, prohibiting off-road traffic outside the designated project area, and observing a maximum daytime speed limit of 15 miles per hour would reduce these impacts.

Project and den closure activities could adversely affect San Joaquin kit foxes if dens are occupied. Limiting project activities to the proposed July 18 – October 30 timeframe would largely avoid the spring-summer pupping season, and establishing a construction exclusion zone around any occupied sites and immediately halting den closure activities and contacting the Service if occupancy is determined would further reduce these impacts.

San Joaquin kit foxes could become trapped in excavated holes, trenches, pipes, culverts, or other similar structures. Inspecting and covering excavated holes or trenches greater than 2 feet deep at the end of each work day with suitable materials, providing escape routes constructed of earthen materials or wooden planks, thoroughly inspecting holes before filling, and inspecting and capping pipes, culverts, or similar structures when not in use would minimize the likelihood of these impacts.

Vehicle traffic on the existing access road is expected to increase temporarily during project activities. Reclamation's proposal to limit traffic speeds to 15 miles per hour should increase the vehicle driver's ability to detect any individuals crossing the road and reduce the likelihood of injury or mortality to the species.

Trash left during or after project activities could attract predators to the work site, which could, in turn, prey on San Joaquin kit foxes, or introduce competition for food and shelter. This potential impact would be reduced or avoided by the control of waste products at the work site.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or habitat to a degree where San Joaquin kit foxes are adversely affected or killed. The potential for this effect to occur will be reduced by thoroughly informing workers of the importance of preventing hazardous materials from entering the environment and having an effective spill response plan in place.

Uninformed workers could disturb, injure, or kill San Joaquin kit foxes. The potential for this to occur would be reduced by educating workers as to the presence and protected status of this species and the measures that are being implemented to protect it during project activities by a Service-approved biologist.

In summary, the proposed action could adversely affect San Joaquin kit foxes due to the possible occurrence of the species and presence of suitable habitat; however, the likelihood that the species would be present is low, and Reclamation and SCVWD have proposed avoidance and

minimization measures to reduce potential impacts. Based on these factors and the temporary nature of the impacts, we anticipate that few, if any, San Joaquin kit foxes are likely to be killed or injured during this work.

Effects on Recovery

We anticipate that effects on recovery of the San Joaquin kit fox will be minimal. The action area lies outside of designated recovery or linkage areas for the San Joaquin kit fox, and is found near the limit of the species' current known range. Project impacts would be primarily temporary, affect a small amount of suitable San Joaquin kit fox habitat, and result in minimal if any change in population numbers and distribution. No long-term effects to the species or to recovery are expected as a result of the proposed project activities.

Summary of Effects to San Joaquin kit fox

Based on the absence of San Joaquin kit foxes and lack of suitable denning sites found during previous surveys in the action area, the small area and temporary duration of most project impacts, and the proposed conservation measures to be implemented by Reclamation and SCVWD, we conclude that few, if any, San Joaquin kit foxes are likely to be killed or injured as a result of project activities. The proposed project would affect at most a small number of San Joaquin kit foxes, if any occur within the action area. Loss of a small number of den sites could occur if any San Joaquin kit fox are detected within the proposed work area and dens are excavated as proposed in the conservation measures. We anticipate no long-term effects to the overall population, breeding and reproductive capacity, and recovery of the San Joaquin kit fox due to Reclamation's proposed activities.

Least Bell's vireo

Least Bell's vireos have not been previously observed in the action area and suitable habitat is limited, but the site has the potential to be occupied. Approximately 2 acres of marginal least Bell's vireo breeding and foraging habitat are found within the action area, adjacent to but outside of proposed areas of direct ground disturbance. Temporary indirect impacts to least Bell's vireos using breeding and foraging habitat adjacent to areas of ground disturbance could occur from project activities occurring within the March 15 – September 15 breeding season. We expect that proposed construction activities will result in no direct impacts to least Bell's vireos, and that temporary indirect impacts would be minimized with implementation of the proposed conservation measures.

Project activities, including the presence of workers, vehicles, and equipment and resulting noise and vibration, could cause least Bell's vireos to leave or avoid suitable habitat nearby. Moving to an unfamiliar territory may expose adults to exhaustion and reduced fitness or starvation associated with decreased foraging opportunities, increased predation risk, inter- and intra-specific interactions, and decreased probability of nesting success. If an active nest is present, juveniles could be flushed from protected areas, increasing predation risk. Based on the range of

territory sizes for the least Bell's vireo (0.5 to 7.5 acres) and the limited area of habitat in the action area, the proposed project could realistically affect only one territory, at most. Conducting the project near the end of the breeding season, and establishing adequate buffer zones around nests if they do occur, would reduce these effects.

Human presence may attract predators to an area. Predators as well as parasitic cowbirds may be able to "home in" on least Bell's vireos that become agitated by human presence and destroy or parasitize vireo nests (TNC 1997, Chace et al. 2002). Trash left during or after project activities could attract predators including coyotes (*Canis latrans*) and raccoons (*Procyon lotor*) that could prey on least Bell's vireo eggs or nestlings. This potential impact would be reduced or avoided by careful control of trash during the project.

Nighttime lighting and activity could cause behavioral disturbance and temporary avoidance of the area by least Bell's vireos, and in turn could preclude nesting in illuminated riparian habitat, cause nighttime disorientation, and increase vulnerability to predators. The proposed measure to avoid nighttime construction to the extent feasible and limit the extent of lighting if used should prevent or minimize this effect.

Activities including excavation, compaction and grading occurring adjacent to riparian habitat may produce noise and negatively affect least Bell's vireos. Many songbirds, including the least Bell's vireo, are sensitive to prolonged, loud noises; construction-related noise and vibrations can adversely affect breeding and nesting behavior and reduce nesting success. If construction noise increases after a least Bell's vireo has established a nest or breeding territory near the project, nest abandonment could occur, resulting in a failed breeding attempt, death of eggs and fledglings, exposure of adults to increased predation risk, negative inter- and intraspecific interactions, and decreased foraging opportunities. Moreover, least Bell's vireos rely on auditory signals in the form of songs, alarm and scolding calls to establish and defend territories, attract a mate, feed and care for young at the nest, and locate and evade potential predators (Scherzinger 1979). Increased ambient noise levels may hinder the ability of the species to cue in on these signals. The Service uses 60 decibels (dB) as a practical threshold above which substantial impacts to the least Bell's vireo may occur. Based upon this threshold, RECON (1989) estimated that noise levels above 60 dB from March 15 to September 15 may impact least Bell's vireo reproductive success. Limiting noise levels in riparian habitat within the action area to below 60 decibels would reduce these impacts.

In summary, the proposed action could adversely affect the least Bell's vireo due to the possible occurrence of the species and presence of suitable habitat; however, the likelihood that the species would be present is low, and Reclamation and SCVWD have proposed avoidance and minimization measures to reduce potential impacts. Based on these factors and the temporary nature of the impacts, we anticipate that few, if any, least Bell's vireos are likely to be killed or injured during this work.

Effects on Recovery

We anticipate that effects on recovery of the least Bell's vireo will be minimal. The action area lies outside of currently and historically occupied sites for which recovery targets were established in the draft recovery plan. Project impacts will be primarily temporary, indirectly affect a small amount of marginal least Bell's vireo habitat, and result in minimal or no change in population numbers and distribution. The preconstruction surveys that would be conducted in association with this project may also provide valuable information about the species, which if found at the site could represent a step towards its further range expansion and recovery. No long-term effects to the species or to recovery are expected as a result of the proposed project.

Summary of effects to least Bell's vireo

Based on the absence of least Bell's vireos during previous surveys in the action area, the limited amount and marginal quality of available habitat, the lack of direct project impacts and temporary duration of indirect impacts, and the proposed conservation measures to be implemented by Reclamation and SCVWD, we conclude that few, if any, least Bell's vireos are likely to be killed or injured as a result of project activities. The proposed project would affect at most a small number of least Bell's vireos, limited to one nesting pair and their fledglings, if any occur within the action area. We anticipate no long-term effects to the overall population, breeding and reproductive capacity, and recovery of the least Bell's vireo due to Reclamation's proposed activities.

California red-legged frog and California tiger salamander

California red-legged frogs and California tiger salamanders have not been previously observed in the action area, but localities of each species are found near the project site within their respective known dispersal distances. Breeding, non-breeding, and dispersal habitat for each species is present, though the quality of aquatic breeding habitat is likely marginal and the effective quantity of upland non-breeding aestivation habitat (refugia such as small mammal burrows) may be limited. We anticipate proposed construction activities to result in mostly temporary impacts to approximately 2.5 acres of suitable habitat for the California red-legged frog and California tiger salamander, consisting primarily of upland dispersal and non-breeding/aestivation habitat, and smaller areas of aquatic breeding (and for California red-legged frogs, non-breeding) habitat. We expect these impacts would be reduced with implementation of the proposed conservation measures to avoid and minimize temporary and permanent effects to California red-legged frogs and California tiger salamanders.

All California red-legged frogs and California tiger salamanders that occur in the action area could be adversely affected by project activities. Injury or mortality could occur from animals being crushed by earth-moving equipment, debris, and worker foot traffic. Individuals remaining in burrows may be killed or injured by the large machinery used to dig trenches; by project filling or grading activities; or they may become trapped and die if the entrance to their upland sheltering habitat is crushed or covered. California red-legged frogs and California tiger

salamanders may experience a significant disruption of normal behavioral patterns from work activities and their associated noise and vibration to the point that reaches the level of harassment. This disruption could cause California tiger salamanders or California red-legged frogs to leave or avoid suitable habitat and may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles on roadways. Pre-construction surveys and the relocation of individuals by a Service-approved biologist would reduce these impacts.

Activities within and adjacent to aquatic and wetland habitats could kill or injure California red-legged frogs and California tiger salamanders and impact their habitat. Use of heavy equipment and worker presence in wetland areas and pools adjacent to the levee, if required for culvert replacement, could impact any life stage of the California tiger salamander or California red-legged frog if the species are using these areas for breeding. Downhill transport of excavated soil from the levee berm into adjacent wetlands and pools could reduce water quality. Pumping equipment used to dewater Tequisquita Slough at culvert Station 86+80 could entrap and kill or injure adults, juveniles and larvae and destroy egg masses if present, and removal of water could strand eggs and larvae. Installation of a temporary coffer dam into the streambed of Tequisquita Slough could injure or kill individuals. Reclamation's proposed avoidance measures, including conducting work in the dry season, limiting activities to the levee surface to the extent feasible, installing fish screens on pumping equipment to prevent entrapment of amphibians, surveying for and relocating amphibians from work areas, and use of silt fencing around the work area would reduce these impacts.

California red-legged frogs and California tiger salamanders can disperse overland in mesic conditions if substantial rainfall (greater than 0.5 inch of rain in a 24-hour period) occurs. During such periods of rainfall, we expect a higher likelihood of California red-legged frogs or California tiger salamanders occurring in the project area. Any amphibians moving through the project site would be at risk of injury or death caused by vehicles, equipment, or workers, and fencing and excavation of linear trenches could entrap frogs and interfere with their movement. Reclamation's proposal to conduct project activities between July 18 and October 30 when California red-legged frogs and California tiger salamanders are less likely to disperse and to stop work in the event of rain would reduce these impacts.

Capture and relocation of California red-legged frogs and California tiger salamanders could result in injury or death. Reclamation proposes to reduce this risk by using Service-approved biologists, limiting the duration of handling, and requiring the proper transport of these species. Although survivorship for translocated California red-legged frogs and California tiger salamanders has not been estimated, survivorship of translocated wildlife in general is reduced due to intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, and increased risk of predation.

Observations of diseased and parasite-infected amphibians are now frequently reported. Releasing amphibians following a period of captivity, during which time they can be exposed to infections, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried between habitats on the hands, footwear, or equipment of

fieldworkers, which can spread them to localities containing species that have had little or no prior contact with such pathogens or parasites. Chytrid fungus is a water-borne fungus that can be spread through direct contact between aquatic animals and by a spore that can move short distances through the water. The fungus only attacks the parts of an animal's skin that have keratin (thickened skin), such as the mouthparts of tadpoles and the tougher parts of adults' skin, such as the toes. It can decimate amphibian populations, causing fungal dermatitis, which usually results in death in 1 to 2 weeks. Infected animals may spread the fungal spores to other ponds and streams before they die. Once a pond has become infected with chytrid fungus, the fungus stays in the water for an undetermined amount of time. Relocation of individuals captured from the project area could contribute to the spread of chytrid fungus. In addition, infected equipment or footwear could introduce chytrid fungus into areas where it did not previously occur.

Trash left during or after project activities could attract predators to the work site, which could in turn prey upon California red-legged frogs and California tiger salamanders. For example, raccoons (*Procyon lotor*) and feral cats (*Felis catus*) are attracted to trash and also prey opportunistically on the California red-legged frog and California tiger salamander. This potential impact would be reduced or avoided by control of waste products at all work sites.

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

Uninformed workers could disturb, injure, or kill California red-legged frogs and California tiger salamanders. The potential for this to occur would be reduced by educating workers on the presence and protected status of these species and the measures that are being implemented to protect them during project activities. The use of flagging to demarcate work areas would reduce these potential impacts by preventing workers from encroaching into adjacent environmentally sensitive habitat.

Nighttime lighting and activity could cause temporary avoidance of the area by amphibians. The proposed measure to avoid nighttime construction to the extent feasible and limit the extent of lighting if used should prevent or minimize this effect.

In summary, the proposed action could adversely affect California red-legged frogs and California tiger salamanders due to nearby occurrences of the species and the availability of dispersal, aestivation, and potential aquatic breeding and non-breeding habitat in the action area. However, Reclamation and SCVWD have proposed avoidance and minimization measures to reduce these impacts, and California red-legged frogs and California tiger salamanders would likely be present in low numbers if they occur, given that the nearest known localities of each species occur near the limit of their respective dispersal distances from the project site. Based on

these factors, the absence of either species in the action area in prior surveys, and the temporary nature of most impacts, we anticipate that few California red-legged frogs and California tiger salamanders are likely to be killed or injured during this work.

Effects on Recovery

California red-legged frog: We anticipate that effects on recovery of the California red-legged frog will be minimal. As stated above in the Status of the Species in the Action Area section, the action area lies within the Diablo Range and Salinas Valley Recovery Unit and within and near the northern boundary of the Santa Clara Valley Core Recovery Area. The proposed project would not increase the threats currently impacting the California red-legged frog in this Recovery Unit or Core Area as identified in the Recovery Plan and described above, or preclude the Service's ability to implement recovery actions (Service 2002). Project impacts would be primarily temporary, affect a very small area (2.5 acres) of suitable habitat within the 54,670 acre Santa Clara Valley Core Area, and with implementation of the proposed conservation measures would result in minimal change in population numbers and distribution. No long-term effects to the species or to recovery are expected as a result of the proposed project activities.

California tiger salamander: We anticipate that effects on recovery of the central California tiger salamander will be minimal. As stated above in the Status of the Species in the Action Area section, the action area lies within the Bay Area Recovery Unit and within and near the northern boundary of the Southwest Diablo Management Unit. The proposed project would not increase the threats currently impacting the central California tiger salamander in this Recovery Unit or Management Unit as identified in the draft Recovery Plan and described above, or preclude the Service's ability to implement recovery actions (Service 2016). Project impacts would be primarily temporary, affect a very small area (2.5 acres) of suitable habitat within the 551,730-acre Southwest Diablo Management Unit, and with implementation of the proposed conservation measures would result in minimal change in population numbers and distribution. No long-term effects to the species or to recovery are expected as a result of the proposed project activities.

Summary of effects to California red-legged frog and California tiger salamander

Based on the absence of California red-legged frogs and California tiger salamanders during previous surveys in the action area, the presence of non-native predators in aquatic habitat, the small area and temporary duration of impacts, and the proposed conservation measures to be implemented by Reclamation and SCVWD, we conclude that few, if any, California red-legged frogs or California tiger salamanders are likely to be killed or injured as a result of project activities. The proposed project would affect a small number of California red-legged frogs and California tiger salamanders, if any occur within the work areas. We anticipate no long-term effects to the overall population, breeding and reproductive capacity, and recovery of the California red-legged frog or California tiger salamander due to Reclamation's proposed activities.

California tiger salamander critical habitat

Critical habitat Unit EB-12 of designated critical habitat for the California tiger salamander Central population comprises approximately 6,642 acres, of which approximately 2.5 acres are in the action area. We expect proposed construction activities to result in primarily temporary impacts to California tiger salamander critical habitat. This represents a small portion (.04%) of critical habitat Unit EB-12, and .001 % of the 199,109 acres of total critical habitat throughout the range of the Central population. The affected area includes primarily upland aestivation (PCE 2) and dispersal (PCE3) habitat and smaller areas of aquatic breeding habitat (PCE 1).

PCE 1 in the action area is likely of marginal value, due to the presence of non-native predators and the long hydroperiod of aquatic features under some conditions which may sustain predator populations. Work in and adjacent to aquatic and wetland habitats in the action area and the dewatering of Tequisquita Slough could decrease the conservation value of PCE 1 locally, but these impacts would be temporary. Reclamation proposes to avoid work in aquatic and wetland habitats to the extent feasible and to implement best management practices to prevent sediment transport into these habitats which would minimize impacts to PCE 1. Scattered small mammal burrows and active ground squirrels have been identified in the action area and erosional features and rock crevices may be present in the levee berm (PCE 2). Removal of small mammal burrows during excavation could slightly decrease the conservation value of PCE 2 in the action area, but this loss may be largely temporary given the local presence of fossorial mammals. Any part of the action area may serve as upland dispersal habitat (PCE 3) during mesic conditions, given the absence of significant movement barriers. The value of PCE 3 would not be permanently affected, though erection of silt fencing, grading activities, and disturbance from construction could temporarily reduce the value of PCE 3. All areas to be disturbed during construction would be allowed to return to their prior condition, eventually providing habitat quality similar to preconstruction conditions.

Summary of effects to California tiger salamander critical habitat

The effects of the proposed action on designated critical habitat for the California tiger salamander Central population would be primarily temporary in nature, and affect a very small proportion of critical habitat Unit EB-12 and of the overall critical habitat designation for the Central population. We do not expect significant long-term adverse effects to the primary constituent elements to occur as a result of the proposed action. PCE 1 is likely of marginal existing conservation value in the action area, and project activities would affect aquatic habitat only temporarily. The function of PCE 2 in the action area may decrease slightly if scattered small mammal burrows within the area of ground disturbance are removed, but these features would likely return over time given the ongoing presence of fossorial mammals. PCE 3 will not be permanently affected. The existing conservation function of designated critical habitat for the California tiger salamander in the action area will be maintained due to the small area of impact and the temporary nature of most project activities, thus we expect no long-term effects to critical habitat Unit EB-12 to result from the action.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act. Most of the action area is federally owned, and any future projects on these lands would be subject to separate section 7 consultation.

Activities on private agricultural and grazing lands adjoining the levee right-of-way could affect all four species, which could be subject to harassment and disturbance from routine farming activities. Rodent control could affect San Joaquin kit foxes, California red-legged frogs and California tiger salamanders by reducing burrow availability, and could result in secondary poisoning of kit foxes. Cowbirds could be attracted to the actively grazed pastures and parasitize least Bell's vireo nests.

Non-native bullfrogs, crayfish, and fish in privately-owned San Felipe Lake likely move into aquatic habitats in the action area in wet years and seasons, and may predate California red-legged frogs and California tiger salamanders.

CONCLUSION

The regulatory definition of "to jeopardize the continued existence of the species" focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the status of the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander and its critical habitat as the basis to assess the overall effect of the proposed action on each species.

San Joaquin kit fox

Reproduction

Construction activities could cause San Joaquin kit foxes to temporarily avoid or leave the action area if present, and individuals could be forced to leave occupied dens by implementation of the proposed avoidance measures. Few if any San Joaquin kit fox are expected to be present given the small size of the action area and their absence in prior surveys. To minimize the project's effects on reproduction of San Joaquin kit fox, Reclamation proposes to survey for and avoid natal dens in the project footprint and conduct work activities largely outside of the species' reproductive period. These actions should effectively reduce any project related impacts to the species. Therefore, we expect the local effect of the proposed project on reproduction of the San Joaquin kit fox to be minimal, and conclude that the proposed project will not appreciably reduce the San Joaquin kit fox's ability to reproduce rangewide.

Numbers

The Applicant proposes numerous measures to avoid injuring or killing individual San Joaquin kit foxes, including pre-construction surveys, avoidance of active dens, and exclusionary measures to prevent direct injury. Some injury or mortality may still occur, due to vehicle strikes, attraction of predators, or displacement of individuals to areas where they become more vulnerable to these and other threats. However, due to the absence of San Joaquin kit foxes during previous surveys of the action area, the small number of recent occurrences in northern San Benito and southern Santa Clara Counties, and the measures proposed to avoid and minimize project effects, we expect that few if any San Joaquin kit foxes would be killed or injured. Therefore, we have determined that implementation of the proposed project is not expected to appreciably reduce numbers of the San Joaquin kit fox at the local level or rangewide.

Distribution

The project has a very small footprint, is located near the limit of the current known range of the San Joaquin kit fox, and would result in largely temporary impacts to a small area of suitable habitat. Given the limited number of recent occurrences of the species in northern San Benito County, its detection in the action area would be significant. Permanent displacement of individuals from the action area, if present, could result if exclusion of San Joaquin kit fox from occupied burrows is necessary to prevent injury, but we expect these animals would relocate to other habitat within the project vicinity. Therefore, although implementation of the proposed project and avoidance measures could remove a very small amount of occupied or suitable habitat for the species, we conclude that it will not appreciably reduce the distribution of the species at the local or rangewide level. The proposed preconstruction surveys may also provide useful data regarding the species current range should San Joaquin kit fox be detected in the action area.

Recovery

The action area lies outside of designated recovery or linkage areas for the San Joaquin kit fox, is found near the limit of the species' current known range, and San Joaquin kit foxes have not been previously observed in the action area. Project impacts would be primarily temporary, affect a small amount of suitable San Joaquin kit fox habitat and few if any individuals, and Reclamation would avoid natal dens within the project footprint. The project would thus result in no appreciable change in population numbers and distribution and we expect no long-term effects to recovery of the San Joaquin kit fox.

Conclusion for the San Joaquin kit fox

After reviewing the current status of San Joaquin kit fox, the environmental baseline for the action area, the effects of the proposed San Felipe Pipeline Road/Levee and Culvert Repair project and the cumulative effects, it is the Service's biological opinion that the San Felipe

Pipeline Road/Levee and Culvert Repair project, as proposed, is not likely to jeopardize the continued existence of the San Joaquin kit fox, because:

1. The project would not appreciably reduce reproduction of the species either locally or rangewide;

2. San Joaquin kit fox have not been observed previously in the action area and the project would affect a very small number of individuals, if any, and thus would not appreciably reduce numbers of the San Joaquin kit fox at the local level or rangewide;

3. The project would not reduce the species' distribution either locally or rangewide; and

4. The project would not cause any effects that would preclude our ability to recover the species.

Least Bell's vireo

Reproduction

Noise and other disturbance associated with construction activities could cause least breeding Bell's vireos to temporarily avoid or leave the action area if present or reduce their nesting success, and attraction of nest predators and parasitic cowbirds could lead to nest failure. Few if any least Bell's vireos are expected to be present or breed in the action area, given the limited amount of marginal breeding habitat available and the absence of the species in prior surveys. To minimize the project's effects on reproduction of the least Bell's vireo, Reclamation proposes to survey for and avoid nesting vireos, limit noise levels in vireo habitat, control trash that may attract nest predators, and conduct work activities largely outside of the breeding season. These actions should effectively reduce any project related impacts to the species. Therefore, we expect the local effect of the proposed project on reproduction of the least Bell's vireo to be minimal, and conclude that the proposed project will not appreciably reduce the species' ability to reproduce rangewide.

Numbers

The area of direct impacts does not encompass least Bell's vireo breeding habitat, and Reclamation proposes measures to reduce indirect impacts that could harass, injure or kill individuals or their young, such as establishing buffers around nests and limiting noise levels in riparian habitat. Based on the small area of marginally suitable habitat in the action area and the range of territory sizes for the least Bell's vireo, we expect only one territory (2 adults and their offspring) at most could be affected. The species has not been observed previously in the action area and occurs in only two isolated localities in the greater vicinity. While a detection of the species in the action area would be significant, we expect that with the proposed conservation measures few if any least Bell's vireos would be killed or injured by the proposed action.

Therefore, we have determined that implementation of the proposed project is not expected to appreciably reduce numbers of the least Bell's vireo locally or rangewide.

Distribution

The project is located outside of what is considered the current breeding range of the least Bell's vireo, though two isolated occurrences are found in the greater vicinity. The action area has a small footprint, would entail only temporary indirect impacts to a limited area of suitable habitat, and take place largely outside of the species' breeding season. Given the near-absence of the species at present from its historic range in northern San Benito County, its detection in the action area would represent a significant recolonization of historical habitat. However, we expect that with the conservation measures proposed by Reclamation, any vireos present would not likely be disturbed or leave the action area. Therefore, we conclude that the project will not appreciably reduce the distribution of the species at the local or rangewide level, and the proposed preconstruction surveys may provide useful data regarding the species' recent range expansion and recolonization of historic localities.

Recovery

The action area lies outside of currently and historically occupied sites for which recovery targets were established in the draft recovery plan for the least Bell's vireo. The action area includes a small area of suitable habitat and project impacts to vireos, if present, would be indirect and temporary. Least Bell's vireos have not been previously observed in the action area and the project site is expected to support no more than one breeding pair, if any, though detection of the species would be significant and could serve as an indicator of the species' overall recovery. Reclamation has proposed conservation measures which would minimize indirect effects to least Bell's vireos, and the project is not expected to prevent colonization of the site by the species. The project would thus result in no appreciable change in population numbers and distribution and we expect no long-term effects to recovery of the least Bell's vireo. The proposed preconstruction surveys may also provide useful data regarding the species' recent range expansion and overall recovery.

Conclusion for the least Bell's vireo

After reviewing the current status of the least Bell's vireo, the environmental baseline for the action area, the effects of the proposed San Felipe Pipeline Road/Levee and Culvert Repair project and the cumulative effects, it is the Service's biological opinion that the San Felipe Pipeline Road/Levee and Culvert Repair project, as proposed, is not likely to jeopardize the continued existence of the least Bell's vireo, because:

1. The project would not appreciably reduce reproduction of the species either locally or rangewide;

2. Least Bell's vireos have not been observed previously in the action area and the project would affect a very small number of individuals, if any, and thus would not appreciably reduce numbers of the least Bell's vireo at the local level or rangewide;

3. The project would not reduce the species' distribution either locally or rangewide; and

4. The project would not cause any effects that would preclude our ability to recover the species, and could provide useful data relevant to its recovery.

California red-legged frog

Reproduction

Construction activities in upland habitat could injure or kill adult California red-legged frogs remaining in burrows or dispersing through the project area. Dewatering activities and work conducted in or adjacent to wetland and aquatic habitats could harm any life stage of the California red-legged frog if using these areas for breeding, and temporarily degrade or reduce available breeding habitat. The loss of reproductive individuals, eggs and larvae, and breeding habitat could temporarily lower the reproductive capacity of the local population. However, we expect such impacts to be small due to the absence of the species in prior surveys, small area and brief duration of impacts, presence of non-native predators in available aquatic habitat, and measures Reclamation has proposed to protect California red-legged frogs which include working outside of the breeding season, avoiding wetland habitats to the extent feasible, and surveying for and relocating California red-legged frogs from the work area. Therefore, we expect the proposed project to result in minimal impacts to breeding California red-legged frogs and conclude that the project will not appreciably reduce the reproduction of the species locally or rangewide.

Numbers

A small number of California red-legged frogs may be injured or killed as a result of construction activities and capture and relocation efforts. Although localities occur within dispersal distance of the action area, the number of California red-legged frogs present in the action area is expected to be low, because the species has not been recorded during prior surveys and various non-native predators have been observed in aquatic habitats in the action area. The short duration of the project and the range of conservation measures proposed by Reclamation will minimize the number of California red-legged frogs lost as a result of project activities. Therefore, we conclude that the loss of the small number of individuals, if any, which may occur during the proposed project would not appreciably reduce the local or rangewide population of the California red-legged frog.

Distribution

The proposed project could injure, kill, or temporarily displace a small number of California red-legged frogs, but the species has not been observed previously in the action area and Reclamation has proposed conservation measures to minimize the risk of adverse effects on individuals. Construction activities may remove a small amount of upland sheltering habitat and temporarily impact aquatic habitat, but most areas affected by the project would return to their previous condition and habitat value. The project would affect a small proportion of the California red-legged frog habitat available in the local vicinity and an even smaller proportion of the habitat available in the species' geographic range. Therefore, we conclude that the project will not appreciably reduce the distribution of the California red-legged frog at the local or rangewide level.

Recovery

The action area lies within the Santa Clara Valley Core Area of the Diablo Range and Salinas Valley Recovery Unit for the California red-legged frog. The action area includes a small area of suitable habitat, and project impacts to California red-legged frogs would be largely temporary and minimized by the proposed conservation measures. The proposed project would not increase the threats currently impacting the California red-legged frog in this Recovery Unit or Core Area, result in no appreciable change in reproduction, population numbers and distribution, and would not preclude the Service's ability to implement any of the measures identified in the recovery plan for the species. Therefore we conclude that the proposed project would not appreciably reduce the likelihood of recovery of the California red-legged frog.

Conclusion for the California red-legged frog

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, the effects of the proposed San Felipe Pipeline Road/Levee and Culvert Repair project and the cumulative effects, it is the Service's biological opinion that the San Felipe Pipeline Road/Levee and Culvert Repair project, as proposed, is not likely to jeopardize the continued existence of the California red-legged frog, because:

1. The project would not appreciably reduce reproduction of the species either locally or rangewide;

2. The project would affect a very small number of individuals, if any, and thus would not appreciably reduce numbers of the California red-legged frog at the local level or rangewide;

3. The project would not reduce the species' distribution either locally or rangewide; and

4. The project would not cause any effects that would preclude our ability to recover the species.

California tiger salamander

Reproduction

Construction activities in upland habitat could injure or kill adult California tiger salamanders remaining in burrows or dispersing through the project area. Dewatering activities and work conducted in or adjacent to wetland and aquatic habitats could harm any life stage of the California tiger salamander if using these areas for breeding, and temporarily degrade or reduce available breeding habitat. The loss of reproductive individuals, eggs and larvae, and breeding habitat could temporarily lower the reproductive capacity of the local population. However, we expect such impacts to be small due to the absence of the species in prior surveys for larvae and adults, the small area and brief duration of impacts, presence of non-native predators in aquatic habitat, and measures Reclamation has proposed to protect California tiger salamanders which include working outside of the breeding season, avoiding wetland habitats to the extent feasible, and surveying for and relocating California tiger salamanders from the work area. Therefore, we expect the proposed project to result in minimal impacts to breeding California tiger salamanders and conclude that the project will not appreciably reduce the reproduction of the species locally or rangewide.

Numbers

A small number of California tiger salamanders may be injured or killed as a result of construction activities and capture and relocation efforts. Although ten breeding localities occur within 5 miles of the action area including two within the species' known dispersal distance, the number of California tiger salamanders present in the action area is expected to be low, because the species has not been recorded during prior surveys and various non-native predators have been observed in aquatic habitats in the action area. The short duration of the project, small area of impacts, and range of conservation measures proposed by Reclamation will minimize the number of California tiger salamanders lost as a result of project activities. Therefore, we conclude that the loss of the small number of individuals, if any, which may occur during the proposed project would not appreciably reduce the local or rangewide population of the California tiger salamander central population.

Distribution

The proposed project could injure, kill, or temporarily displace a small number of California tiger salamanders, but the species has not been observed previously in the action area and Reclamation has proposed conservation measures to minimize the risk of adverse effects on individuals. Construction activities may remove a small amount of upland aestivation habitat and temporarily impact aquatic breeding habitat, but most areas affected by the project would return to their previous condition and habitat value. The project would affect a small proportion of the California tiger salamander habitat available in the local vicinity and an even smaller proportion of the habitat available in the Central population's relatively large geographic range.

Therefore, we conclude that the project will not appreciably reduce the distribution of the species at the local or rangewide level.

Recovery

The action area lies within the Southwest Diablo Management Unit of the Bay Area Recovery Unit for the central population of the California tiger salamander. The action area includes a small area of suitable habitat, and project impacts to California tiger salamanders would be largely temporary and minimized by the proposed conservation measures. The proposed project would not increase the threats currently impacting the California tiger salamander in this Recovery Unit or Management Unit, result in no appreciable change in California tiger salamander reproduction, population numbers and distribution, and would not preclude the Service's ability to implement any of the measures identified in the draft recovery plan for the species. Therefore we conclude that the proposed project would not appreciably reduce the likelihood of recovery of the California tiger salamander central population.

Conclusion for the California tiger salamander

After reviewing the current status of the California tiger salamander Central population, the environmental baseline for the action area, the effects of the proposed San Felipe Pipeline Road/Levee and Culvert Repair project and the cumulative effects, it is the Service's biological opinion that the San Felipe Pipeline Road/Levee and Culvert Repair project, as proposed, is not likely to jeopardize the continued existence of the California tiger salamander, because:

1. The project would not appreciably reduce reproduction of the species either locally or rangewide;

2. The project would affect a very small number of individuals, if any, and thus would not appreciably reduce numbers of the California tiger salamander Central population at the local level or rangewide;

3. The project would not reduce the species' distribution either locally or rangewide; and

4. The project would not cause any effects that would preclude our ability to recover the species.

California tiger salamander critical habitat

We expect proposed construction activities including excavation, grading, and dewatering to result in a small area of primarily temporary impacts to California tiger salamander critical habitat Unit EB-12. The area of ground disturbance (2.5 acres) represents .04% of Unit EB-12 and .001% of total critical habitat for the Central population, and most of the area impacted would be allowed to return to its prior state and habitat value following project completion. A very small area of permanent impacts to critical habitat could result from loss of small mammal

burrows though these features are not abundant in the action area, and given the local presence of ground squirrels, this impact would likely also be largely temporary.

The action area includes all the primary constituent elements (PCEs 1, 2 and 3), and the function and conservation value of these would not be appreciably reduced by the project. Aquatic breeding habitat (PCE 1) is likely of marginal conservation value at present, at least in wet years and possibly at all times, given the presence of aquatic predators within and adjacent to the action area and the frequent connectivity of aquatic habitats to perennial San Felipe Lake. The project would avoid aquatic habitats to the extent feasible, and any unavoidable impacts from dewatering of Tequisquita Slough and other activities would be temporary and not affect their long-term function. Upland non-breeding habitat (PCE 2) in the action area consists of scattered small mammal burrows and spaces in soil and rock in the levee berm. These features are not abundant in the action area, but some could be lost during construction. This would constitute a small reduction in the conservation value of PCE 2 that we expect would be largely temporary given the local presence of fossorial mammals. Functional dispersal habitat (PCE 3) is present in the action area and in adjacent pastures. Excavation may temporarily create local barriers to California tiger salamander movement, but we expect no permanent change to the function or value of PCE 3.

Conclusion for California tiger salamander critical habitat

After reviewing the current status of the critical habitat of the California tiger salamander Central population, the environmental baseline of critical habitat for the action area, the effects of the proposed San Felipe Pipeline Road/Levee and Culvert Repair project on critical habitat, and the cumulative effects, it is the Service's biological opinion that the San Felipe Pipeline Road/Levee and Culvert Repair project, as proposed, is not likely to result in the destruction or adverse modification of critical habitat of the California tiger salamander Central population, because:

1. The project would have largely temporary effects on a small portion of critical habitat Unit EB-12;

2. The project would have small and temporary effects on PCEs 1 and 3, and small and largely temporary effects on PCE 2; and

3. The overall function and conservation value of PCEs 1, 2 and 3 would not be appreciably reduced by the project locally or in critical habitat Unit EB-12.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly

impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

In June 2015, the Service finalized new regulations implementing the incidental take provisions of section 7(a)(2) of the Act. The new regulations also clarify the standard regarding when the Service formulates an Incidental Take Statement [50 CFR 402.14(g)(7)], from "...if such take may occur" to "...if such take is reasonably certain to occur." This is not a new standard, but merely a clarification and codification of the applicable standard that the Service has been using and is consistent with case law. The standard does not require a guarantee that take will result; only that the Service establishes a rational basis for a finding of take. The Service continues to rely on the best available scientific and commercial data, as well as professional judgment, in reaching these determinations and resolving uncertainties or information gaps.

San Joaquin kit fox

We anticipate that some San Joaquin kit foxes could be taken as a result of the proposed action. We expect the incidental take to be in the form of harassment and harm from noise and visual disturbance, heavy equipment use, vehicle and foot traffic, and lighting from night work if unavoidable. San Joaquin kit foxes could also experience increased exposure to predation, vehicle strikes, and other threats if disturbed by work activities and displaced from habitats in the action area.

We cannot quantify the precise number of San Joaquin kit foxes that may be taken as a result of Reclamation's proposed action because San Joaquin kit foxes move over time; for example, animals may enter or leave the action area after the time of pre-construction surveys. San Joaquin kit foxes may be difficult to detect because they are primarily nocturnal, have extensive home ranges, and utilize subsurface dens that may extend up to 6 feet underground. Finding a dead or injured San Joaquin kit fox may also be unlikely due to their small size, cryptic coloration, and potential to be quickly scavenged. The protective measures proposed by Reclamation are likely to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of San Joaquin kit foxes that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that we expect few, if any, San Joaquin kit foxes to be observed in the action area, and that adverse effects to the species would likely be low given the nature of the proposed activities. Therefore, we anticipate that take of San Joaquin kit foxes

would also be low. We also recognize that for every San Joaquin kit fox found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Therefore, if 1 occupied den is identified or 1 San Joaquin kit fox is found dead or wounded, Reclamation must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

Least Bell's vireo

We anticipate that some least Bell's vireos could be taken as a result of the proposed action. We expect the incidental take to be in the form of harassment and harm from indirect effects associated with noise, vibration, and visual disturbance from construction activities, lighting from night work if unavoidable, and attraction of nest predators and cowbirds to the construction site. Least Bell's vireo adults and juveniles could also experience increased predation risk if disturbed by work activities and displaced from the action area into unfamiliar habitat.

We cannot quantify the precise number of least Bell's vireos that may be taken as a result of Reclamation' proposed action because least Bell's vireos move over time; for example, animals may enter or leave the action area after the time of pre-construction surveys. Least Bell's vireos may be difficult to detect due to their preference for dense riparian habitat, and death or injury of individuals displaced to areas outside of the action area would be difficult to observe. Finding a dead or injured least Bell's vireo may also be unlikely due to their small size, potentially large territory, and the likelihood that dead individuals would be quickly scavenged. The protective measures proposed by Reclamation are likely to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of least Bell's vireos that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that we expect few, if any, least Bell's vireos to be observed in the action area, and that adverse effects to the species would likely be low given the nature of the proposed activities. Therefore, we anticipate that take of least Bell's vireos would also be low. We also recognize that for every least Bell's vireo found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Therefore, if 1 least Bell's vireo adult, subadult, or egg is found dead or injured, Reclamation must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption

provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

California red-legged frog and California tiger salamander

We anticipate that some California red-legged frogs and California tiger salamanders could be taken as a result of the proposed action. We expect the incidental take to be in the form of capture during relocation activities and in the form of harassment, harm, injury, or death as a result of construction activities if they are accidentally injured or killed during capture and relocation or are unable to be collected for relocation and remain in active construction areas. The probability of these risks may be increased if substantial rainfall (greater than 0.5 inch of rain in a 24-hour period) occurs, and California red-legged frogs and/or California tiger salamanders are dispersing through the area during work activities. California red-legged frogs and California tiger salamanders could also be killed or wounded by predators if they abandon habitat within or adjacent to work areas and be subject to desiccation if they leave shelter sites.

We cannot quantify the precise number of California red-legged frogs or California tiger salamanders that may be taken as a result of Reclamation's proposed action because both species move over time; for example, animals may enter or leave the action area after the time of pre-construction surveys. California red-legged frogs and California tiger salamanders may be difficult to detect due to their small body size and use of aquatic habitats, underground burrows, or dense cover. Animals injured or killed during translocation efforts are likely to be observed; however, mortality from other sources, including the indirect effects of translocation (e.g., unable to find food in a new location) or displacement from the action area, would be difficult to observe. Finding a dead or injured California red-legged frog or California tiger salamander may also be unlikely due to their cryptic coloration and potential to be quickly scavenged. The protective measures proposed by Reclamation are likely to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of California red-legged frogs or California tiger salamanders that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that we expect few, if any, California red-legged frogs or California tiger salamanders to be observed in the action area, and that adverse effects to these species would likely be low given the nature of the proposed activities. Therefore, we anticipate that take of California red-legged frogs and California tiger salamanders would also be low. We also recognize that for every California red-legged frog or California tiger salamander found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Similarly, for estimating the number of California red-legged frogs and California tiger salamanders that would be taken by capture, we cannot predict how many may be encountered for reasons stated earlier. While the benefits of relocation (i.e., minimizing mortality) outweigh

the risk of capture, we must provide a limit for take by capture at which consultation would be reinitiated because high rates of capture may indicate that some important information about the species in the action area was not apparent (e.g., it is much more abundant than previously believed). Conversely, because capture and relocation can be highly variable, depending upon the species and the timing of the activity, we do not anticipate a number so low that reinitiation would be triggered before the effects of the activity were greater than what we determined in the Effects Analysis.

Therefore, if 2 adult or juvenile California red-legged frogs or 2 adult or juvenile California tiger salamanders are found dead or wounded, or if 5 adult or juvenile California red-legged frogs or 5 adult or juvenile California tiger salamanders are captured and relocated, Reclamation must contact our office immediately to reinitiate formal consultation. If any other life stages of the California red-legged frog or California tiger salamander are identified in the action area that are completely dependent on water, such as egg masses, tadpoles, or larvae, Reclamation must contact our office immediately so we can review the project activities to determine if additional protective measures are needed. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary, and must be undertaken by Reclamation or made binding conditions of any grant, contract or permit issued to SCVWD, as appropriate, 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 assume and implement the terms and conditions or (2) fails to require SCVWD to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, contract or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, Reclamation or SCVWD must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the incidental take of San Joaquin kit foxes, least Bell's vireos, California red-legged frogs, and California tiger salamanders:

1. Reclamation must ensure that the level of incidental take that occurs during project implementation is commensurate with the analysis contained herein.

2. Biologists must be authorized by the Service before they survey for San Joaquin kit foxes, least Bell's vireos, California red-legged frogs, and California tiger salamanders, before they excavate dens for San Joaquin kit foxes, and before they capture and move California red-legged frogs and California tiger salamanders in the action area.

3. Effects to the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander must be minimized in the action area.

TERMS AND CONDITIONS

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

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

    a. If any San Joaquin kit foxes are encountered in action area, work must immediately cease and the Service be promptly contacted to determine the best procedure to continue minimizing adverse effects to the species. If 1 occupied San Joaquin kit fox den is identified or 1 San Joaquin kit fox is found dead or wounded, Reclamation must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions. Contact the Ventura Fish and Wildlife Office at (805) 644-1766.

    b. If any least Bell's vireos are encountered in the action area, work must immediately cease and the Service be promptly contacted to determine the best procedure to continue minimizing adverse effects to the species. If 1 least Bell's vireo adult, subadult, or egg is found dead or injured, Reclamation must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

    c. If any life stages of the California red-legged frog or California tiger salamander are identified in the action area that are completely dependent on water, such as egg masses, tadpoles, or larvae, work must immediately cease and the Service be promptly contacted to determine the best procedure to continue minimizing adverse effects to the species. If 2 adult or juvenile California red-legged frogs or 2 adult or juvenile California tiger salamanders are found dead or injured, or if 5 adult or juvenile California red-legged frogs or 5 adult or juvenile California tiger salamanders are relocated, Reclamation must contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease during this review period because the exemption provided under section 7(o)(2) would lapse and any additional take would not be exempt from the section 9 prohibitions.

2. The following term and condition implements reasonable and prudent measure 2:

> Reclamation and SCVWD must request our approval of any biologists that they or their contractors employ to conduct project activities associated with the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander pursuant to this biological opinion. Such requests must be in writing, and be received by the Ventura Fish and Wildlife Office at least 30 days prior to any such activities being conducted. Please be advised that possession of a 10(a)(1)(A) permit for the covered species does not substitute for the implementation of this measure. Authorization of Service-approved biologists is valid for this project only.

3. The following terms and conditions implement reasonable and prudent measure 3:

   a. To ensure effects to the San Joaquin kit fox, least Bell's vireo, California red-legged frog, and California tiger salamander and its critical habitat are minimized, Reclamation, SCVWD, and its contractors must follow and implement all of the conservation measures specified above under the Description of the Proposed Action (measures 1 through 23). If any of these measures are not followed at any time work must immediately cease and the Service be promptly contacted to determine the best procedure to continue minimizing adverse effects to the species.

   b. Prior to the onset of any project related activities, the Service-approved biologist must identify appropriate locations to receive California red-legged frogs and California tiger salamanders from the project area in the event that they need to be relocated. These locations must be in proximity to the project site, contain suitable habitat, not be affected by project activities, and be free of exotic predatory species (i.e., bullfrogs, crayfish) to the best of the approved biologist's knowledge.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), Reclamation must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement to the Service's Ventura Fish and Wildlife Office (2493 Portola Road, Suite B, Ventura, California 93003) within 60 days following completion of the proposed project. Reclamation has specified that SCVWD will prepare and submit a final report to Reclamation and the Service documenting compliance with the above measures and reporting all impacts to the species. The report must describe all activities that were conducted under this biological opinion, including activities that were described in the proposed action and required under the terms and conditions, and discuss any problems that were encountered in implementing conservation measures or terms and conditions and any other pertinent information. The report must also include the following information:

> The number of San Joaquin kit foxes observed and the number killed or injured during project related activities; the dates and times of observation, mortality, or injury; specific locations of observation, mortality or injury; the approximate size and age of individuals; the

number and locations of all known, occupied, and natal dens identified; and the locations of all excavated dens.

The number of least Bell's vireos observed and the number killed or injured during project related activities; the dates and times of observation, mortality, or injury; specific locations of observation (including nest locations, if known), mortality or injury; and the approximate size and life stage of individuals.

The number of California red-legged frogs and California tiger salamanders found, captured and relocated from the project area, and killed or injured during project activities; the dates and times of capture, mortality, or injury; specific locations of capture, mortality, or injury; approximate size and life stage of individuals; and a description and map of relocation sites.

The Service recognizes that SCVWD may author the report(s) described above. However, Reclamation must review the report(s) to determine compliance with the Terms and Conditions of this biological opinion prior to submitting them to the Service.
Upon completion of the project, Reclamation or SCVWD must report all observations of federally listed species to CDFW for inclusion in the CNDDB.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured San Joaquin kit fox, least Bell's vireo, California red-legged frog, or California tiger salamander, initial notification within 3 working days of its finding must be made by telephone and in writing to the Ventura Fish and Wildlife Office (805-644-1766). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

Reclamation and SCVWD must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. Reclamation and SCVWD must transport injured animals to a qualified veterinarian. Should any treated San Joaquin kit foxes, least Bell's vireos, California red-legged frogs, or California tiger salamanders survive, Reclamation or SCVWD must contact the Service regarding the final disposition of the animal(s).

Any San Joaquin kit foxes found dead must be provided to the California Department of Fish and Wildlife. Contact the CDFW warden or wildlife biologist for Monterey County at telephone (831) 649-2870. Any least Bell's vireos found dead must be provided to the Western Foundation of Vertebrate Zoology; Contact: Rene Corado, Collections Manager, Western Foundation of Vertebrate Zoology, 439 Calle San Pablo, Camarillo, CA 93012, (805) 388-9944. We recommend that dead California red-legged frogs and California tiger salamanders identified in the action area be tested for amphibian disease, and that dead California tiger salamanders undergo genetic analysis for the purpose of investigating hybridization; however, this recommendation is discretionary and to be determined by Reclamation upon contacting the Ventura Fish and Wildlife Office at the discovery of a dead California red-legged frog or California tiger

salamander. If Reclamation chooses not to submit dead California red-legged frogs or California tiger salamanders for testing, they must be placed with the California Academy of Sciences; Contact: Jens Vindum, Collections Manager, California Academy of Sciences Herpetology Department, Golden Gate Park, San Francisco, California, 94118,
(415) 750-7037.

CONSERVATION RECOMMENDATIONS

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

1. We recommend that the Service-approved biologist(s) relocate any other native reptiles or amphibians found within work areas to suitable habitat outside of project areas if such actions are in compliance with State laws.

2. We recommend that dead California red-legged frogs and California tiger salamanders identified in the action area be tested for amphibian disease, and that dead California tiger salamanders undergo genetic analysis for the purpose of investigating hybridization.

3. We recommend that the Corps investigate the efficacy of capturing and moving California red-legged frogs and California tiger salamanders to determine if use of this measure reduces adverse effects of project actions on these species, including collecting information on repeat capture and behavior of individuals post-movement.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of Reclamation's action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) Reclamation's action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Mark Ogonowski of my staff at 805-644-1766 extension 370, or by electronic mail at mark_ogonowski@fws.gov.

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PERSONAL COMMUNICATIONS

Brandon Sanderson, California Department of Fish and Wildlife, December 1, 2015

APPENDICES

APPENDIX A. The Declining Amphibian Populations Task Force Fieldwork Code of Practice

The Declining Amphibian Populations Task Force Fieldwork Code of Practice

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

2. Boots, nets, traps, and other types of equipment used in the aquatic environment should then be scrubbed with 70 percent ethanol solution and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond, wetland, or riparian area.

3. In remote locations, clean all equipment with 70 percent ethanol or a bleach solution, and rinse with sterile water upon return to the lab or "base camp." Elsewhere, when washing-machine facilities are available, remove nets from poles and wash in a protective mesh laundry bag with bleach on the "delicates" cycle.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable vinyl[2] gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean them as directed above and store separately at the end of each field day.

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

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

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

The Fieldwork Code of Practice has been produced by the Declining Amphibian Populations Task Force with valuable assistance from Begona Arano, Andrew Cunningham, Tom Langton, Jamie Reaser, and Stan Sessions.

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2 Do not use latex gloves as latex is toxic to amphibians.

For further information on this Code, or on the Declining Amphibian Populations Task Force, contact John Wilkinson, Biology Department, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK, e-mail: DAPTF@open.ac.uk.