**USFWS FESA Biological Opinion for San Joaquin Kit Fox and Bald Eagle.** Formal USFWS consultation on the effects of the existing Los Vaqueros Reservoir on the San Joaquin kit fox (federally endangered) and bald eagle (formerly federally threatened, now delisted; state endangered) resulted in a BO from USFWS (USFWS 1-1-92-F-48, September 3, 1993). The BO lists several terms and conditions that the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and CCWD must comply with. Measures that affect long-term management in the watershed include:

- "CCWD shall acquire and protect in perpetuity a total of 7,544 acres of habitat for San Joaquin kit fox, which includes 6,513 acres within the watershed and 1,031 acres in two separate mitigation areas outside the watershed (BO pg 23), depending upon final assessment of all impacts from the project." (Note that recreational impacts to San Joaquin kit fox habitat were lower than initially anticipated. As a result, the required amount of dedicated conservation easement became 5,837 acres. As of December 2008, 4,150 acres have been conveyed to CDFG and an additional 1,856 acres are proposed to be conveyed to CDFG (see **Figure 4.6-14**)). "The habitat will be managed by CCWD under a USFWS- and CDFG-approved habitat management plan. This acreage amounts to a 3:1 mitigation ratio (compensation lands: impacted lands) for project impacts to San Joaquin kit fox habitat."

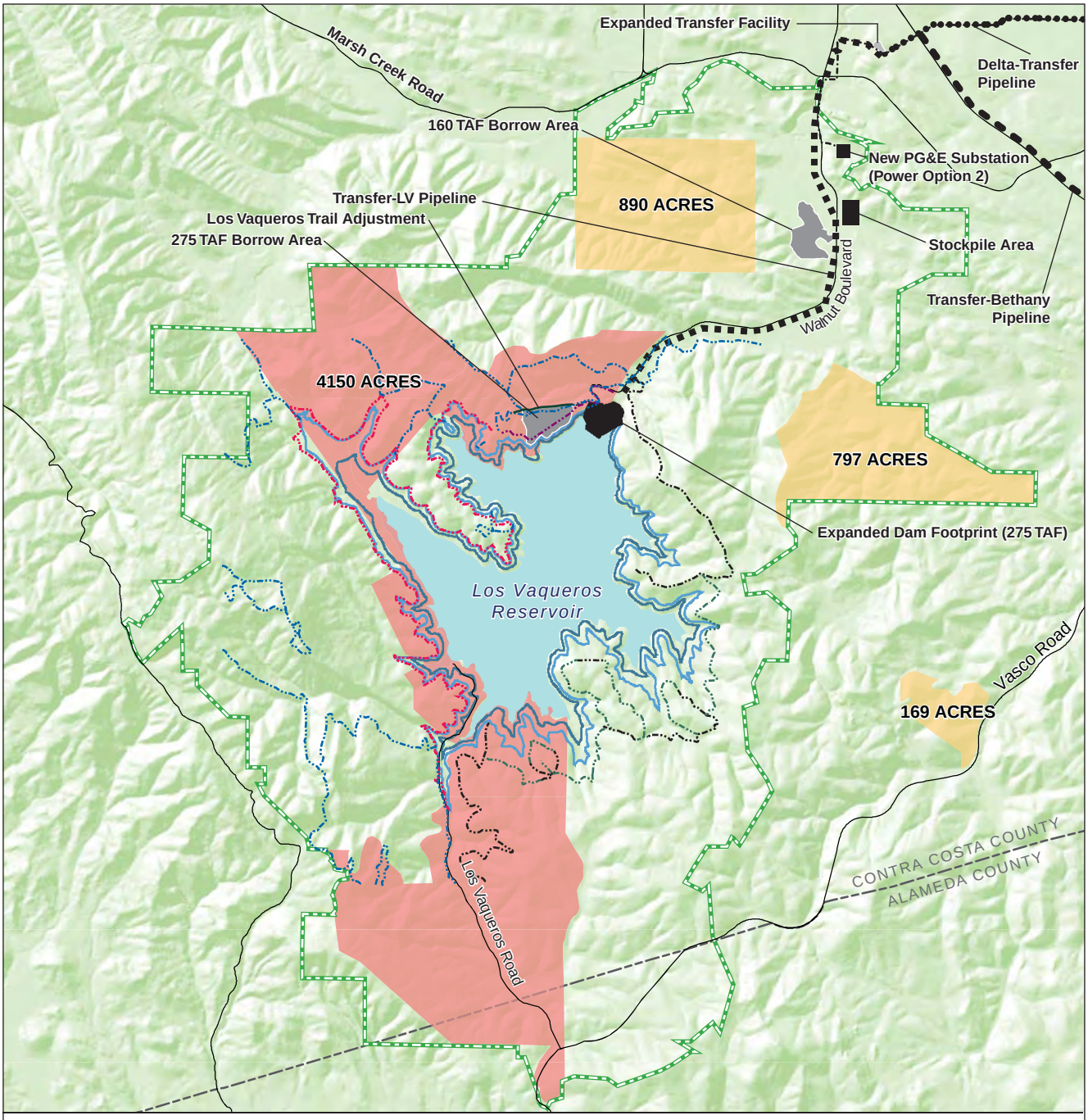
- "CCWD shall develop a recreation plan that addresses potential effects on San Joaquin kit fox and bald eagle in the watershed. USFWS and CDFG shall have approval authority over the plan to ensure that any potential effects on these species are reduced to an 'insignificant level.'"

- "CCWD shall monitor bald eagles in the watershed to help determine the effects of recreation on bald eagle use of the area and the mortality rates resulting from wind turbines in the project area. These effects shall be studied by CCWD using a USFWS- and CDFG-approved monitoring and study plan."

**USFWS FESA Biological Opinion for California Red-Legged Frog and Alameda Whipsnake.** Formal consultation concerning the effects of the existing Los Vaqueros Reservoir on the California red-legged frog (federally threatened) and a conference report on the effects on the Alameda whipsnake (federally threatened) resulted in a BO from USFWS (USFWS 1-1-96-F-151, November 8, 1996) (USFWS, 1996). As with the previous BO, this opinion lists several nondiscretionary terms and conditions that Reclamation and CCWD must comply with. Conditions that affect long-term management for these species in the watershed include the following:

- "CCWD shall monitor the extent and quality of California red-legged frog habitat to ensure that it does not decline over time. If any mitigation sites (ponds and wetlands) that were specifically created for California red-legged frog fail to support successfully reproducing California red-legged frogs for at least 1 year within the next 5 years from the date of this BO, the site shall be replaced at a 3:1 ratio."

- "Wetlands that are identified for California red-legged frog mitigation must maintain adequate water levels throughout the year to provide suitable California red-legged frog breeding habitat. Mitigation includes 12.21 acres of wetlands, 10.59 acres of riparian, and 11.23 acres of stock ponds."




SOURCE: USGS, 1993 (base map); CNDDB, 2007; and ESA, 2007

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**Figure 4.6-14**

Location of San Joaquin Kit Fox Easements within Los Vaqueros Watershed

- "Wetland and riparian habitats downstream of Los Vaqueros Dam site shall be monitored to ensure those areas are maintained as wetland habitats."

- "All alkali marsh mitigation wetlands shall be planted with bulrush at densities specified in the BO. The vegetation at these sites shall be monitored as they mature to ensure that they remain suitable for California red-legged frogs."

- "Monitor all stock ponds, created ponds, and semipermanent and alkali marsh mitigation wetlands in April, July, August, September, October, and once in winter of every year for water level, stage of California red-legged frog development, and presence of bullfrogs. Report the results of this monitoring effort by January 15 of every year of the project."

- "Livestock fencing in areas specified in the BO must be maintained in perpetuity to protect California red-legged frog habitat."

- "CCWD shall prepare and submit for approval to USFWS a Predator Management Plan for the project area. The plan will include measures to reduce or eliminate habitat for bullfrogs, monitoring for the presence of bullfrogs and their egg masses, dewatering stock ponds with bullfrogs, and success criteria."

- "Changes in land uses identified in the watershed management program and the resource management plan shall not occur without additional consultation with USFWS."

- "Visitor use shall be limited and pets shall be prohibited from Drainage Units D, E, F, and G. No recreational activities shall be allowed in the California red-legged frog mitigation sites (see **Figure 4.6-15** for mitigation site locations). See **Figure 4.6-16** for access restrictions in the watershed."

- "Mosquito abatement and the application of any herbicides or pesticides in the project area must be approved by USFWS."

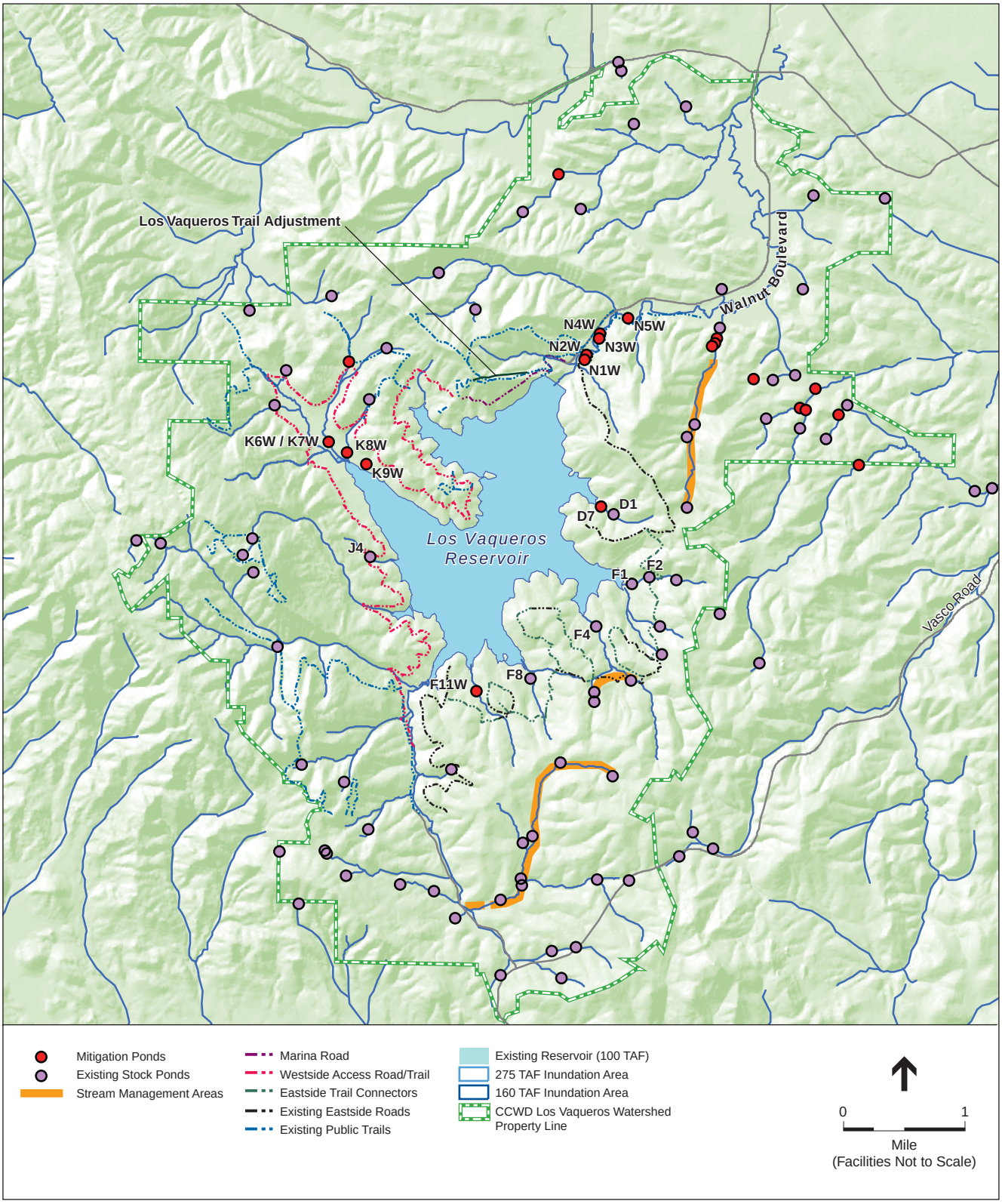
- "No construction activities, public vehicle traffic (including trams), bikes, or recreational facilities shall be allowed within 500 feet of chaparral or scrub, excluding Old Vasco Road, which enters the reservoir site from the south."

- "No off-road travel within 500 feet of chaparral or scrub shall be allowed without prior approval by USFWS. See Figure 4.6-16 for access restrictions in the watershed."

- "Vehicle speed limits of 15 mph must be observed within 500 feet of Alameda whipsnake habitat."

- "No additional firebreaks will be constructed in chaparral without USFWS approval."

**USFWS FESA Biological Opinion for Fairy Shrimp (Two Species).** For the existing Los Vaqueros Reservoir, USFWS issued a conference report (USFWS, 1993b), clarification letter, and adoption of the Conference Opinion as a BO with modifications to terms and conditions (USFWS, 1995) for the longhorn fairy shrimp (*Branchinecta longiantenna*; federally endangered) and the vernal pool fairy shrimp (federally threatened).

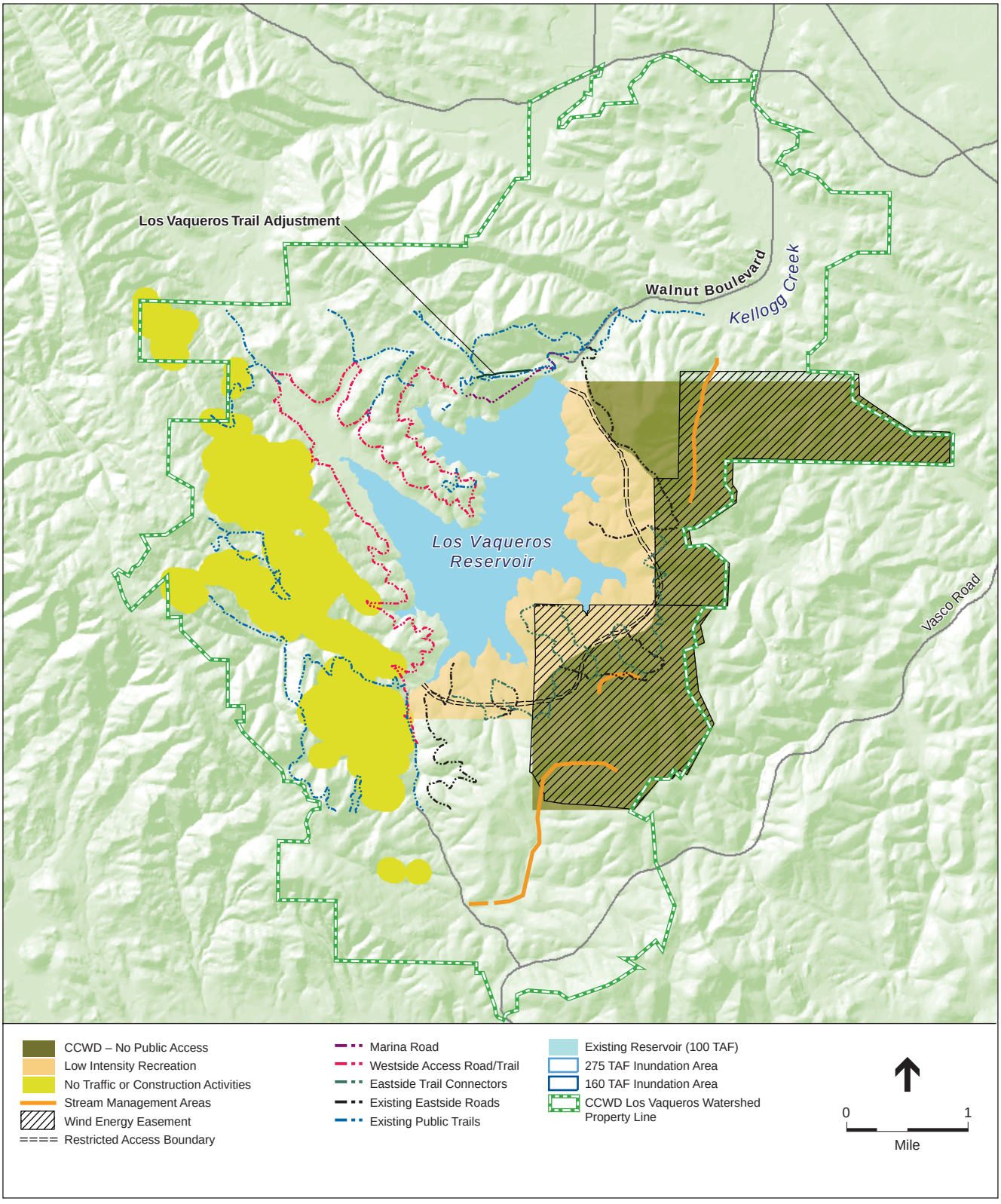



SOURCE: USGS, 1993 (base map); and ESA, 2006

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

**Figure 4.6-15**

Location of Wetlands Created for California Red-Legged Frog and Stockponds within the Los Vaqueros Watershed




SOURCE: USGS, 1993 (base map); CCWD, 2007; and ESA, 2007

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

**Figure 4.6-16**

Existing Access Restrictions within the Los Vaqueros Watershed

These two species of federally listed invertebrates were originally addressed in a conference report by USFWS in 1993 when they were still proposed for listing. After the conference report was issued, both species were formally listed. Therefore, USFWS adopted the conference report into its BO in 1995 after modifying several terms and conditions. Measures that affect long-term management in the watershed include:

- "Human use in the easternmost portion of the Kellogg Creek watershed and in Conservation Area 1…shall be restricted to activities associated with wind energy generation, dry-land farming, grazing, and administration by CCWD. Public use shall be restricted to research and occasional educational activities conducted under the supervision of CCWD staff or other designated land management agencies. This use designation corresponds to the No-Use designation in the conceptual recreation plan. Lands just east of the reservoir will be managed by CCWD to allow low-intensity dispersed recreation use. The eastern boundary of the area shall be fenced to prevent human access to the more restricted easternmost lands and this fence and the Kellogg Creek vernal pools area shall be patrolled to ensure that no trespassing happens and that the fence remains intact. Accepted uses in the lands just east of the reservoir include hiking and boat landing, and associated activities such as picnicking. Except as may be provided under Term and Condition 1b, major facilities shall not be located in this area. This use designation corresponds to the Controlled-Use category in the conceptual recreation plan (USFWS, 1995)."

- "Several areas in the watershed shall be set aside from most human activities. These areas include the easternmost portion of the watershed and Conservation Area 1. (See Figure 4.6-16 for access restrictions in the watershed.) Lands just east of the reservoir shall only have low-intensity, dispersed recreation use. Excluded areas shall be fenced and patrolled to exclude public access."

- "The Kellogg Creek vernal pool complex and a 200-foot buffer are within lands for which a conservation easement has been granted to CDFG."

**Stage II EIS/EIR – Golden Eagle Monitoring Requirements.** Compliance with the federal MBTA, the Bald Eagle Protection Act, and mitigation measures adopted through the CEQA/NEPA process required CCWD to monitor nesting golden eagles. In addition, activities such as construction and recreation should avoid disturbing nesting golden eagles. To accomplish this avoidance, CCWD seasonally closes and reroutes recreation trails that pass within 0.5 mile of nesting golden eagle sites and halts watershed operations in the vicinity of active nests.

### Existing Conservation Commitments

**CDFG CESA Memorandum of Understanding for San Joaquin Kit Fox.** CDFG and CCWD signed a CESA memorandum of understanding for the existing Los Vaqueros Reservoir on February 16, 1994, which outlines several conservation measures that were included in the BO for this species. Measures include acquiring the conservation areas mentioned previously for this species and legally conveying the easements to CDFG, monitoring of kit fox habitat, and several construction-related measures. Other measures include prohibiting the widespread use of rodenticides in the watershed.

### *Sensitive Habitats*

Sensitive habitats include vegetation communities and wetlands that are regulated by resource agencies or are identified in local or regional plans and policies. Sensitive habitats in the study area include oak woodlands, riparian vegetation, emergent marsh, vernal pools, and alkali meadows. Sensitive natural communities in the project area include saline emergent marshlands (alkali meadow, alkali seep, and cismontane alkali marsh), freshwater marsh, northern claypan vernal pool, and valley needlegrass grassland. These sensitive habitats are discussed in Appendix D.

**Stage II EIR/EIS and USFWS Fish and Wildlife Coordination Act Report – Oak Woodland Monitoring Requirements.** As required for water reclamation projects by the mitigation adopted during the CEQA/NEPA process and the Fish and Wildlife Coordination Act, a *Fish and Wildlife Coordination Act Report and Final Recommendations* were prepared by USFWS for the existing Los Vaqueros Reservoir. As part of the report, USFWS prepared and submitted a valley oak and blue oak savanna mitigation plan to CCWD that addressed the mitigation requirements of both the CEQA/NEPA and Fish and Wildlife Coordination Act processes. The plan requires the creation or enhancement of a total of 394 acres of valley oak woodland and savanna and between 16 and 67 acres of blue oak woodland (Fish and Wildlife Coordination Act requirement only). A range for blue oak mitigation was established to address the range of potential impact anticipated for the recreation facilities plan that was still in development at the time. Development of the maximum recreation facilities concept requires up to 67 acres of blue oak mitigation.

**USACE Section 404 Permit – Wetlands.** For the existing Los Vaqueros Reservoir, impacts on wetlands and other waters of the United States regulated under CWA, Section 404, were authorized under an individual permit (Permit No. 199000070) from USACE. Wetlands created for mitigation must meet the Section 404 permit performance standards for both vegetation and hydrology. Mitigation is considered successful if, after 6 years of monitoring, about 80 percent of each wetland type has met USACE's criteria for vegetation and hydrology performance. Wetland creation and enhancement requirements are presented for each wetland type in **Table 4.6-5**.

**TABLE 4.6-5**
**SUMMARY OF ORIGINAL LOS VAQUEROS PROJECT IMPACTS TO WATERS OF THE UNITED STATES AND REQUIRED MITIGATION**

| Wetland Type | Impacts (Acres) | Mitigation Commitment (Acres) | Mitigation Commitment (Type) |
|---|---|---|---|
| Alkali marsh | 2.06 | 4.12 | creation |
| Semipermanent marsh | 3.64 | 7.33 | creation |
| Vernal pool | 0.01 | 0.02 | creation |
| Willow-cottonwood riparian | 0.38 | 0.76 | creation |
| Seasonal wetlands | N/A | 6.48 | creation |
| Alkali grassland and meadow | 3.23 | 30.50 | enhancement |
| **Total** | **9.32** | **49.21** | |

SOURCE: USACE, Section 404 Permit 1990-0070.

# 4.6.2 Environmental Consequences

## Methodology

The impact analysis for biological resources was based on consideration of the following:

- Construction activities and the expected maximum area of ground disturbance
- Long-term operations and the associated area of potential effect
- Existing habitat conditions
- Known or presumed occurrence of sensitive habitats and protected species within or near proposed alternative sites

As defined in **Table 4.6-6**, the following terms are used in this analysis to distinguish areas of potential direct impact from areas of potential indirect impact: "project area" or "project site" refers to the area of potential direct effects that could be physically modified by proposed facilities or activities; "project study area" refers to the area where biological resources were evaluated outside of the proposed facility site boundaries, but where potential indirect effects could occur.

**TABLE 4.6-6**
**DEFINITION OF PROJECT AREA AND PROJECT STUDY AREA**

| Project Component | Project Area (Surveyed for Direct Project Impacts) | Project Study Area (Area Surveyed to Assess Indirect Project Impacts) |
|---|---|---|
| Expanded Reservoir | Maximum extent of surface water inundation, plus 25-feet | A 1,000-foot buffer was physically surveyed for biological resources; the Los Vaqueros Watershed and surrounding watersheds were analyzed to assess regional impacts to special status wildlife species |
| Facilities within Los Vaqueros Watershed | Footprint of proposed facilities | 150-foot buffer surrounding facilities was physically surveyed; the Los Vaqueros Watershed and surrounding watersheds were analyzed to assess regional impacts to special status wildlife species |
| New Delta Intake and Pump Station and Power Supply Infrastructure | Footprint of proposed facilities | A 150-foot buffer surrounding facilities was physically surveyed; areas up to 1.0 mile were assessed for special status wildlife species |
| Pipelines | 200-foot-wide easement for the Delta-Transfer Pipeline and Transfer-LV Pipeline; 300-foot wide easement for the Transfer-Bethany Pipeline | 500-foot wide corridor centered on the alignment was physically surveyed; areas up to 1.0 mile were assessed for special status wildlife species |

SOURCE: ESA, 2008

The evaluation of project impacts on special status plant and wildlife species was based either on known population locations or an assessment of habitat that would be affected. Impacts to special-status species were assessed in terms of potential changes in the amount and distribution of suitable habitat, the relative importance of the affected habitats, and the potential for direct loss

of individuals. The distribution of special status plant and wildlife species that may occur in the project study area, as identified in Table 4.6-4, is organized by project component in **Table 4.6-7**.

Habitat disturbance impacts were defined as temporary or permanent. A temporary impact generally lasts less than one growing season. To better distinguish long-term impacts from permanent impacts, the category of "long-term temporary impact," is used for western pond turtle and San Joaquin kit fox. This term is used in this section to describe temporary habitat disturbances with a duration lasting longer than one growing season. Permanent impacts, as used in this section, are those that would permanently alter the landscape with no return to pre-project conditions. USFWS generally considers "long-term temporary" effects (i.e., effects with a duration of greater than one growing season) as permanent effects.

## Habitat Compensation

The habitat mitigation and compensation ratios presented in this section were derived based on guidance provided in the Multi-Species Conservation Strategy (MSCS) (CALFED, 2000) and input provided during ongoing strategic planning meetings with CDFG and USFWS staff from 2004 to 2008. A summary of habitat compensation ratios relevant to this analysis is provided in Section 4.6.3, and represents both low and high habitat compensation ratios.

The baseline habitat value of impacted lands within the watershed was evaluated using USFWS' Habitat Evaluation Procedure (HEP), which will also be used to establish HEP values for replacement lands. Thus, while mitigation values are presented as a range for selected special-status species and sensitive habitats, final habitat compensation values (e.g., whether temporary impacts to San Joaquin kit fox habitat are mitigated at a 1:1 or 3:1 ratio [compensation lands: impacted lands]) will be determined by how well replacement lands approximate impacted habitat values, and if lower quality habitat can be successfully restored. Higher mitigation ratios are appropriate if mitigation lands are deemed only partially suitable or require some degree of enhancement to balance HEP habitat values.

The MSCS ratios are considered initial guidelines; the permitting agencies will determine project requirements on a case-by-case basis. However, the MSCS compensation ratios provide guidance on the appropriate nature and magnitude of compensation needed to adequately mitigate species- and habitat-based impacts.

## Significance Criteria

The thresholds for determining the significance of impacts for this analysis are based on the environmental checklist in CEQA Guidelines, Appendix G. These thresholds also encompass the factors taken into account under NEPA to assess an impact in terms of its context and intensity.

An alternative would result in a significant impact on terrestrial biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or USFWS

**TABLE 4.6-7**
**SPECIAL-STATUS SPECIES WITH POTENTIAL TO BE AFFECTED, SORTED BY PROJECT FACILITY**

| Special-Status Species | Status: Fed/State/ CNPS/ CALFED | Potential Species Occurrence in Project Study Area: 275-TAF/ 160-TAF Inundation Zone | Watershed/ Recreation Facilities | Transfer - Los Vaqueros Pipeline | Transfer Station | Delta-Transfer Pipeline | Transfer-Bethany Pipeline | Delta Intake Facilities | Power Option 1 | Power Option 2 | NCCP Habitat Associations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Invertebrates** | | | | | | | | | | | |
| FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES | | | | | | | | | | | |
| *Branchinecta longiantenna* Longhorn fairy shrimp | FE/--/--/m | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | NSW |
| *Branchinecta lynch*i Vernal pool fairy shrimp | FT/--/--/m | Unlikely | Unlikely | Unlikely | Unlikely | Potential | Known | Unlikely | Potential | Unlikely | NSW |
| *Desmocerus californicus dimorphus* Valley elderberry longhorn beetle | FT/--/--/R | Known | Known | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | VFR, Gr, US, VFW, UC |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN | | | | | | | | | | | |
| *Branchinecta mesovallensis* Midvalley fairy shrimp | --/--/--/-- | Unlikely | Unlikely | Unlikely | Unlikely | Potential | Potential | Unlikely | Unlikely | Unlikely | NSW |
| *Hygrotus curvipes* Curved-foot hygrotus diving beetle | FSC/--/--/-- | Potential | Potential | Potential | Unlikely | Unlikely | Potential | Unlikely | Potential | Unlikely | NSW |
| **Amphibians** | | | | | | | | | | | |
| FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES | | | | | | | | | | | |
| *Ambystoma californiense* California tiger salamander | FT/CSC/--/m | Known | Known | Known | Potential | Unlikely | Potential | Unlikely | Unlikely | Potential | NFE, NSW, VFR, Gr, VFW |
| *Rana draytonii* California red-legged frog | FT/CSC/--/m | Known | Known | Known | Potential | Unlikely | Potential | Unlikely | Unlikely | Unlikely | NFE, VFR, Gr, VFW |
| **Reptiles** | | | | | | | | | | | |
| FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES | | | | | | | | | | | |
| *Masticophis laterals euryxanthus* Alameda whipsnake (=Alameda striped racer) | FT/ST/--/m | Known | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | VFR, Gr, US, VFW |

**TABLE 4.6-7 (Continued)**
**SPECIAL-STATUS SPECIES WITH POTENTIALTO BE AFFECTED, SORTED BY PROJECT FACILITY**

| Special-Status Species | Status: Fed/State/ CNPS/ CALFED | Potential Species Occurrence in Project Study Area | | | | | | | | | NCCP Habitat Associations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 275-TAF/ 160-TAF Inundation Zone | Watershed/ Recreation Facilities | Transfer - Los Vaqueros Pipeline | Transfer Station | Delta-Transfer Pipeline | Transfer-Bethany Pipeline | Delta Intake Facilities | Power Option 1 | Power Option 2 | |
| **Reptiles (cont.)** | | | | | | | | | | | |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | | | | | | | | | |
| *Actinemys marmorata* Western pond turtle | --/CSC/--/m | Known | Known | Known | Unlikely | Potential | Potential | Potential | Potential | Unlikely | La, NFE, VFR, Gr, US, VFW |
| *Masticophis flagellum ruddocki* San Joaquin whipsnake (=coachwhip) | --/CSC/--/m | Known | Potential | Potential | Unlikely | Potential | Potential | Unlikely | Potential | Unlikely | Gr, US, VFW |
| *Phrynosoma coronatum* Coast horned lizard | --/CSC/--/-- | Potential | Potential | Potential | Unlikely | Potential | Potential | Unlikely | Potential | Unlikely | VFR, US, VFW |
| **Birds** | | | | | | | | | | | |
| FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES | | | | | | | | | | | |
| *Buteo swainsoni* Swainson's hawk | --/ST/-- | Potential | Unlikely | Known | Unlikely | Potential | Potential | Unlikely | Unlikely | Unlikely | VFR, Gr, UC, VFW, NSW, US |
| *Haliaeetus leucocephalus* Bald eagle | BEPA-FD/SE-CFP/--/m | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | La, NFE, VFR, VFW |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN | | | | | | | | | | | |
| *Accipiter cooperi* Cooper's hawk | --/CSC/--/m | Potential | Potential | Potential | Unlikely | Unlikely | Potential | Unlikely | Unlikely | Unlikely | VFR, VFW |
| *Accipiter striatus* Sharp-shinned hawk | --/CSC/--/-- | Potential | Potential | Potential | Unlikely | Unlikely | Potential | Unlikely | Unlikely | Unlikely | VFR, VFW |
| *Agelaius tricolor* Tricolored blackbird | --/CSC/--/m | Potential | Potential | Potential | Unlikely | Potential | Potential | Unlikely | Potential | Potential | NFE, VFR, Gr, UC |
| *Aquila chrysaetos* Golden eagle | BEPA/CSC-CFP/--/m | Known | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Gr, US, VFW |
| *Athene cunicularia hypugea* Western burrowing owl | --/CSC/--/m | Known | Known | Known | Potential | Potential | Known | Potential | Potential | Potential | Gr, UC |
| *Asio flammeus* Short-eared owl | --/CSC/--/-- | Potential | Unlikely | Potential | Potential | Potential | Potential | Unlikely | Potential | Potential | Gr, UC |

**TABLE 4.6-7 (Continued)**
**SPECIAL-STATUS SPECIES WITH POTENTIALTO BE AFFECTED, SORTED BY PROJECT FACILITY**

| Special-Status Species | Status: Fed/State/ CNPS/ CALFED | Potential Species Occurrence in Project Study Area | | | | | | | | | NCCP Habitat Associations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 275-TAF/ 160-TAF Inundation Zone | Watershed/ Recreation Facilities | Transfer - Los Vaqueros Pipeline | Transfer Station | Delta-Transfer Pipeline | Transfer-Bethany Pipeline | Delta Intake Facilities | Power Option 1 | Power Option 2 | |
| **Birds (cont.)** | | | | | | | | | | | |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | | | | | | | | | |
| *Circus cyaneus* Northern harrier | --/CSC/--/m | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Potential | NFE, NSW, Gr, UC |
| *Elanus leucurus* White-tailed (=black shouldered) kite (nesting) | --/CFP/--/m | Potential | Potential | Potential | Unlikely | Potential | Potential | Unlikely | Unlikely | Unlikely | VFR, Gr, UC |
| *Eremophila alpestris actica* California horned lark | --/CSC/--/-- | Potential | Potential | Potential | Unlikely | Potential | Potential | Unlikely | Potential | Potential | Gr, UC |
| *Falco mexicanus* Prairie falcon (nesting) | --/CSC/--/-- | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Gr, US |
| *Lanius ludovicianus* Loggerhead shrike | --/CSC/--/-- | Potential | Potential | Potential | Unlikely | Potential | Potential | Unlikely | Potential | Potential | VFR, Gr, US, VFW |
| *Pandion haliaetus* Osprey | --/CSC/--/m | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | La, VFR |
| **Mammals** | | | | | | | | | | | |
| FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES | | | | | | | | | | | |
| *Vulpes macrotis mutica* San Joaquin kit fox | FE/ST/--/m | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Gr, US, VFW |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN | | | | | | | | | | | |
| *Antrozous pallidus* Pallid Bat | --/CSC/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |
| *Corynorhinus townsendii* Townsend's big-eared bat | --/CSC/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |
| *Eumops perotis californicus* Greater western mastiff bat | FSC/CSC/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |
| *Myotis ciliolabrum* Small-footed myotis bat | FSC/--/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |

**TABLE 4.6-7 (Continued)**
**SPECIAL-STATUS SPECIES WITH POTENTIALTO BE AFFECTED, SORTED BY PROJECT FACILITY**

| Special-Status Species | Status: Fed/State/ CNPS/ CALFED | Potential Species Occurrence in Project Study Area | | | | | | | | | NCCP Habitat Associations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 275-TAF/ 160-TAF Inundation Zone | Watershed/ Recreation Facilities | Transfer - Los Vaqueros Pipeline | Transfer Station | Delta-Transfer Pipeline | Transfer-Bethany Pipeline | Delta Intake Facilities | Power Option 1 | Power Option 2 | |
| **Mammals (cont.)** | | | | | | | | | | | |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | | | | | | | | | |
| *Myotis evotis* Long-eared myotis bat | FSC/--/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |
| *Myotis thysanodes* Fringed myotis bat | FSC/--/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |
| *Myotis volans* Long-legged myotis bat | FSC/--/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |
| *Myotis yumanensis* Yuma myotis bat | FSC/CSC/--/-- | Potential | Potential | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | N/A |
| *Perognathus inornatus inornatus* San Joaquin pocket mouse | --/CSC/--/-- | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Potential | Gr (alkali) |
| *Taxidea taxus* American badger | --/CSC/--/-- | Known | Potential | Potential | Potential | Potential | Potential | Unlikely | Potential | Potential | Gr |
| **Plants** | | | | | | | | | | | |
| FEDERAL OR STATE THREATENED AND ENDANGERED SPECIES | | | | | | | | | | | |
| *Lasthenia conjugens* Contra Costa goldfields | FE/--/1B/m | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | NSW |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN | | | | | | | | | | | |
| *Atriplex cordulata* Heartscale | --/--/1B/-- | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Potential | Unlikely | Unlikely | Unlikely | NSW, Gr |
| *Atriplex depressa* Brittlescale | --/--/1B/m | Unlikely | Known | Unlikely | Unlikely | Unlikely | Potential | Unlikely | Unlikely | Unlikely | NSW, Gr |
| *Atriplex joaquiniana* San Joaquin spearscale | --/--/1B/m | Unlikely | Known | Unlikely | Unlikely | Unlikely | Known | Unlikely | Known | Known | NSW, Gr |
| *Hesperolinon breweri* Brewer's dwarf-flax (=western flax) | --/--/1B/m | Known | Known | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Gr, US, VFW |

**TABLE 4.6-7 (Continued)**
**SPECIAL-STATUS SPECIES WITH POTENTIALTO BE AFFECTED, SORTED BY PROJECT FACILITY**

| Special-Status Species | Status: Fed/State/ CNPS/ CALFED | Potential Species Occurrence in Project Study Area | | | | | | | | | NCCP Habitat Associations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 275-TAF/ 160-TAF Inundation Zone | Watershed/ Recreation Facilities | Transfer - Los Vaqueros Pipeline | Transfer Station | Delta-Transfer Pipeline | Transfer-Bethany Pipeline | Delta Intake Facilities | Power Option 1 | Power Option 2 | |
| **Plants (cont.)** | | | | | | | | | | | |
| FEDERAL OR STATE SPECIES OF SPECIAL CONCERN (cont.) | | | | | | | | | | | |
| *Hibiscus lasiocarpus* Rose-mallow | --/--/2/m | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Known | Unlikely | Unlikely | NFE |
| *Lilaeopsis masonii* Mason's lilaeopsis | --/SR/1B | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Unlikely | Known | Unlikely | Unlikely | TFE |

* **Key to Potential Species Occurrence in Project Study Area: Known =** Species with known distribution in the study area; **Potential** = Species with potential to occur in the study area based on species' range and the presence of potentially suitable habitat; **Unlikely** = Species is unlikely to occur based on focused survey findings and/or lack of suitable habitat. Species not observed during appropriately timed focused surveys and considered absent from project study area.

TAF = thousand acre-feet

**STATUS CODES:**

**Federal (U.S. Fish and Wildlife Service):**
BEPA = Bald Eagle Protection Act
FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government
FPE = Proposed for Listing as Endangered
FPT = Proposed for Listing as Threatened
FSC = (Former) Federal Species of Special Concern (list is no longer maintained)
FC = Candidate for Federal listing

**State (California Department of Fish and Game):**
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SR = Listed as Rare by the State of California (plants only)
CSC = California species of special concern
CFP = California fully protected species

**California Native Plant Society (CNPS):**
List 1A = Plants believed extinct
List 1B = Plants rare, threatened, or endangered in California and elsewhere
List 2 = Plants rare, threatened, or endangered in California but more common elsewhere
List 3 = Plants about which more information is needed
List 4 = Plants of limited distribution

CALFED: (CALFED Bay-Delta Program Multi-Species Conservation Strategy [MSCS] Species Goals)
R = Recovery. Recover species' populations within the MSCS focus area to levels that ensure the species' long-term survival in nature.
r = Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations within the MSCS focus area.
m = Maintain. Ensure that any adverse effects on the species that could be tied to implementation of CALFED actions will be fully offset through implementation of actions beneficial to the species.

**Natural Community Conservation Plan Habitat Type:**
Gr = Grassland
La = Lacustrine
NFE = Nontidal Freshwater Emergent
NSW = Natural Seasonal Wetland
SE = Saline Emergent
TFE = Tidal Freshwater Emergent
UC = Upland Cropland
US = Upland Scrub
VFR = Valley/Foothill Riparian
VFW = Valley/Foothill Woodland Forest

SOURCES: CNPS, 2008; CDFG, 2008; ESA, 2007

- Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFG or USFWS
- Have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404 (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means
- Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory native wildlife corridors, or impede the use of wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan

## Impact Summary

**Table 4.6-8** provides a summary of the impact analysis for biological resources issues based on proposed actions outlined in Chapter 3.

## Impact Analysis

### *No Project/No Action Alternative*

Under the No Project/No Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Implementation of this alternative would neither temporarily nor permanently affect wetlands or other waters of the United States, special status species or their habitat, or sensitive plant communities. Movement corridors and nursery sites for wildlife would remain unchanged. The No Project/No Action Alternative would not conflict with any policies protecting biological resources or approved HCPs or NCCPs, nor degrade the quality of the environment.

### *Construction*

**Impact 4.6.1: Project construction would affect the following NCCP habitat types (CDFG sensitive plant communities in parentheses): Natural Seasonal Wetland (i.e., bulrush-cattail series, northern claypan vernal pool, bush seepweed and saltgrass series), Valley/Foothill Riparian (i.e., Fremont cottonwood series and valley oak series), Grassland (i.e., purple needlegrass series), and Valley/Foothill Woodland Forest (i.e., blue oak series). (Less than Significant with Mitigation)**

Sensitive plant communities in the project study area are shown on **Figure 4.6-17**, **Figure 4.6-18**, and **Figure 4.6-19**. Project impacts, organized by facility and alternative, are presented in **Table 4.6-9**.

**TABLE 4.6-8**
**SUMMARY OF IMPACTS – BIOLOGICAL RESOURCES**

| Impact | Project Alternatives | | | |
|---|---|---|---|---|
| | **Alternative 1** | **Alternative 2** | **Alternative 3** | **Alternative 4** |
| **4.6.1:** Project construction would affect the following NCCP habitat types (CDFG sensitive plant communities in parentheses): Natural Seasonal Wetland (i.e., bulrush-cattail series, northern claypan vernal pool, bush seepweed and saltgrass series), Valley/Foothill Riparian (i.e., Fremont cottonwood series and valley oak series), Grassland (i.e., purple needlegrass series) and Valley/Foothill Woodland Forest (i.e., blue oak series). | LSM | LSM | LSM | LSM |
| **4.6.2:** Project construction could affect potentially jurisdictional wetlands or waters, and streambeds and banks regulated by CDFG. | LSM | LSM | LSM | LSM |
| **4.6.3:** Project construction could affect populations of special-status plant species including brittlescale, San Joaquin spearscale, Brewer's dwarf-flax, and rose-mallow. | LSM | LSM | LSM | NI |
| **4.6.4:** Project construction would result in impacts on California red-legged frog and California tiger salamander, including aquatic breeding habitat and upland aestivation habitat for these species. | LSM | LSM | LSM | LSM |
| **4.6.5:** Project construction would result in direct and indirect impacts on existing populations of and habitat for the western pond turtle. | LSM | LSM | LSM | LSM |
| **4.6.6:** Project construction under Alternatives 1, 2, and 3 would result in direct and indirect impacts on listed vernal pool fairy shrimp and their habitat, and on the non-listed midvalley fairy shrimp and curved-foot hygrotus diving beetle. | LSM | LSM | LSM | NI |
| **4.6.7:** Project construction would have temporary and permanent impacts on potential San Joaquin kit fox habitat and permanently reduce potential regional movement opportunities in one location for this species. | LSM/SU | LSM/SU | LSM/SU | LSM/SU |
| **4.6.8:** Project construction would result in temporary and permanent loss of habitat for burrowing owls. | LSM | LSM | LSM | LSM |
| **4.6.9:** Project construction and operation activities would result in direct and indirect impacts on existing populations of and habitat for the golden eagle, bald eagle, and Swainson's hawk. | LSM<br>B (bald eagle) | LSM<br>B (bald eagle) | LSM<br>B (bald eagle) | LSM<br>B (bald eagle) |
| **4.6.10:** Project construction and increased reservoir water levels would result in temporary and permanent loss of potential and occupied habitat for Alameda whipsnake. | LSM | LSM | LSM | LSM |
| **4.6.11:** Project construction activities could result in direct and indirect impacts on the valley elderberry longhorn beetle and its habitat. | LSM | LSM | LSM | LSM |
| **4.6.12:** Project construction activities could affect active breeding bird nest sites and new powerlines could affect migratory birds. | LSM | LSM | LSM | LSM |
| **4.6.13:** Project construction activities under Alternatives 1 and 2 could affect designated critical habitat for listed species (vernal pool fairy shrimp and Contra Costa goldfields). | LSM | LSM | NI | NI |
| **4.6.14:** Project construction activities could affect nonlisted special-status reptile species (San Joaquin coachwhip and coast horned lizard). | LSM | LSM | LSM | LSM |
| **4.6.15:** Project construction activities could affect nonlisted special-status mammal species (American badger, special-status bats, and San Joaquin pocket mouse). | LSM | LSM | LSM | LSM |

**TABLE 4.6-8 (Continued)**
**SUMMARY OF IMPACTS – BIOLOGICAL RESOURCES**

| Impact | Project Alternatives | | | |
|---|---|---|---|---|
| | Alternative 1 | Alternative 2 | Alternative 3 | Alternative 4 |
| **4.6.16:** Draining the reservoir during project construction under Alternatives 1, 2, and 3 could affect Pacific Flyway species, including waterfowl and shorebirds. | LS | LS | LS | NI |
| **4.6.17:** The project would not result in conflicts with local and regional conservation plans, or local plans or ordinances protecting biological resources. | NI | NI | NI | NI |
| **4.6.18:** Project construction would not make a cumulatively considerable contribution to cumulative effects on special-status species and habitats. | LS | LS | LS | LS |

SU = Significant and Unavoidable
LSM = Less-Than-Significant Impact with Mitigation
LS = Less-Than-Significant Impact
NI = No Impact
B = Beneficial Impact

CDFG = California Department of Fish and Game
NCCP = Natural Community Conservation Plan

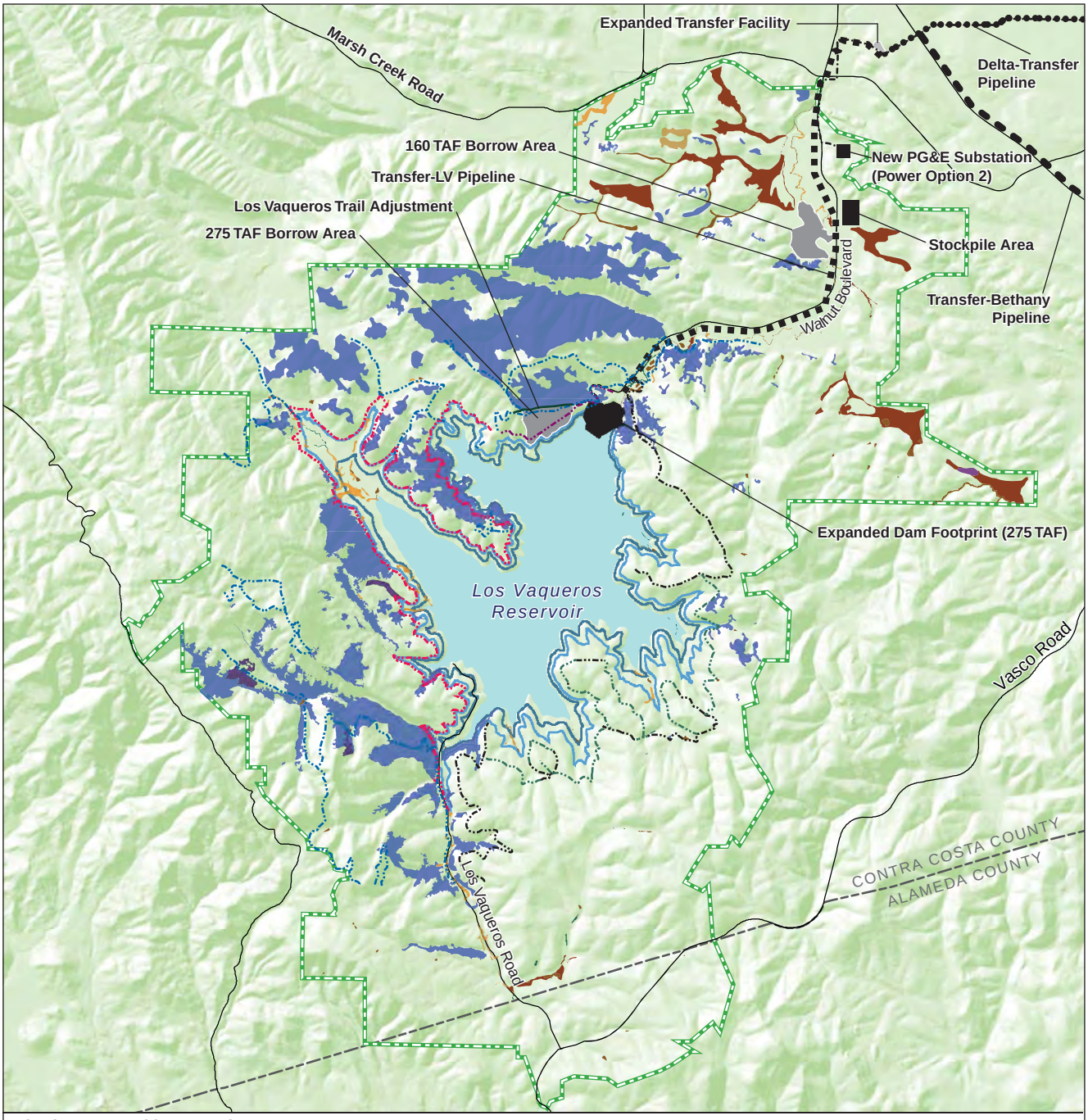
## *Alternative 1*

### Los Vaqueros Reservoir Expansion (including appurtenant facilities) and Recreational Facilities

The reservoir expansion and construction of other facilities in the watershed, including appurtenant facilities, access roads, and Recreation Facilities (referred to in this section as other in-watershed facilities), have the potential to result in losses to the following sensitive plant communities: bulrush-cattail series, saltgrass series, Fremont cottonwood series, valley oak series, purple needlegrass series, and blue oak series.

As shown in Table 4.6-9, about 2.5 acres of cattail-bulrush habitat would be permanently affected by dam construction. About 0.08 acre of saltgrass series (alkali marsh) habitat would be permanently impacted in the 275-TAF inundation zone in stock ponds and stream channels north and east of the reservoir.

Reservoir expansion to 275 TAF would inundate and permanently eliminate 0.94 acre of Fremont cottonwood habitat. An additional 0.07 acre of cottonwood habitat could be directly affected during construction of the westside access road (0.05 acre) and eastside trail (0.02 acre) (Table 4.6-9). During construction the reservoir would be drained and flows to Kellogg Creek would be bypassed around the dam at a flow rate of about 5 cubic feet per second. The downstream reach of Kellogg Creek would receive bypassed flows during the construction period and would also continue to receive flows from the lower watershed during this period. Downstream releases are specifically intended to maintain habitat quality within the Kellogg Creek riparian corridor and maintain the health of cottonwood woodlands and bulrush/cattail habitat downstream of the dam.

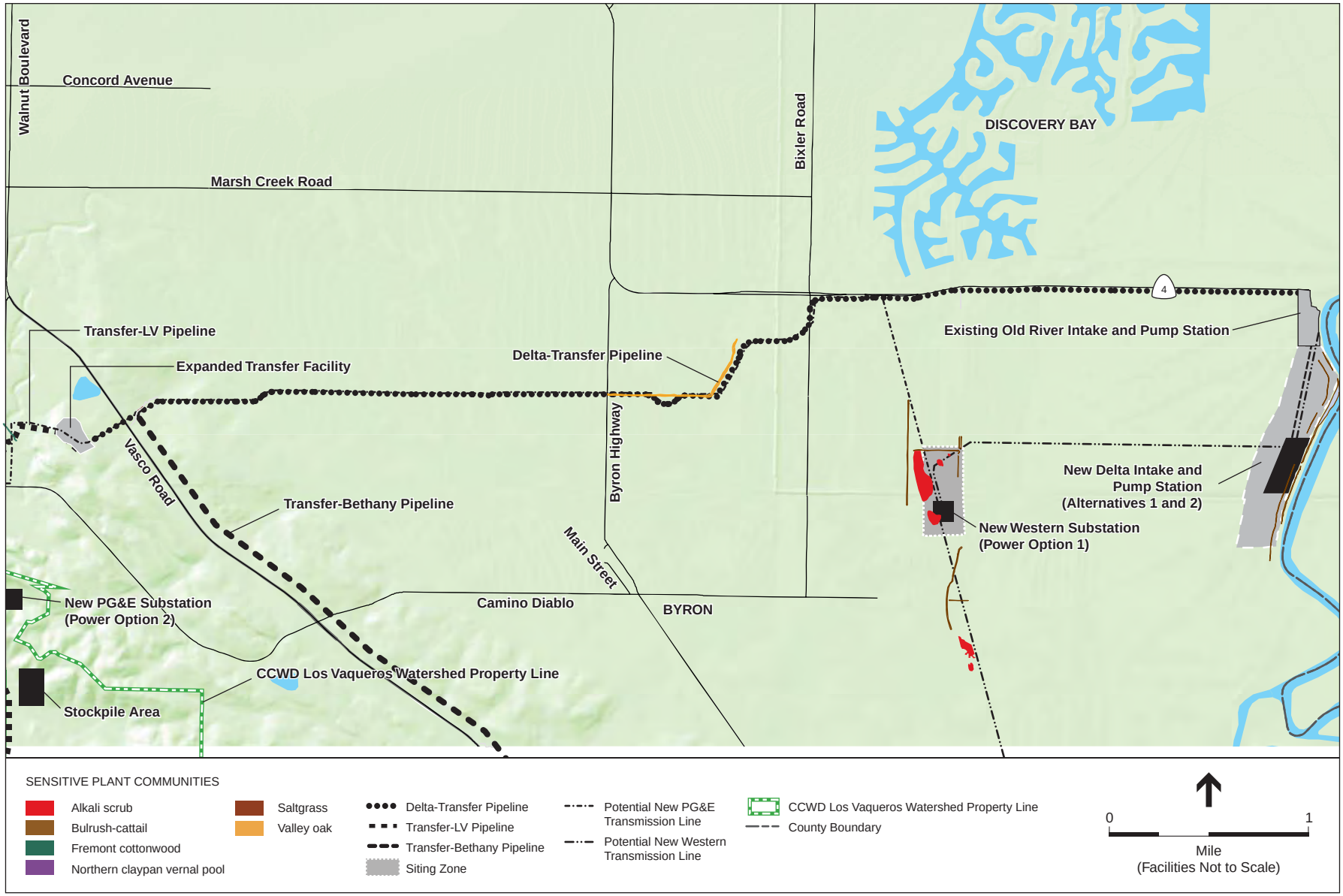



SOURCE: USGS, 1993 (base map); CNDDB, 2007; and ESA, 2007

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

**Figure 4.6-17**

Potential Direct Impacts to Sensitive Plant Communities in the Los Vaqueros Watershed

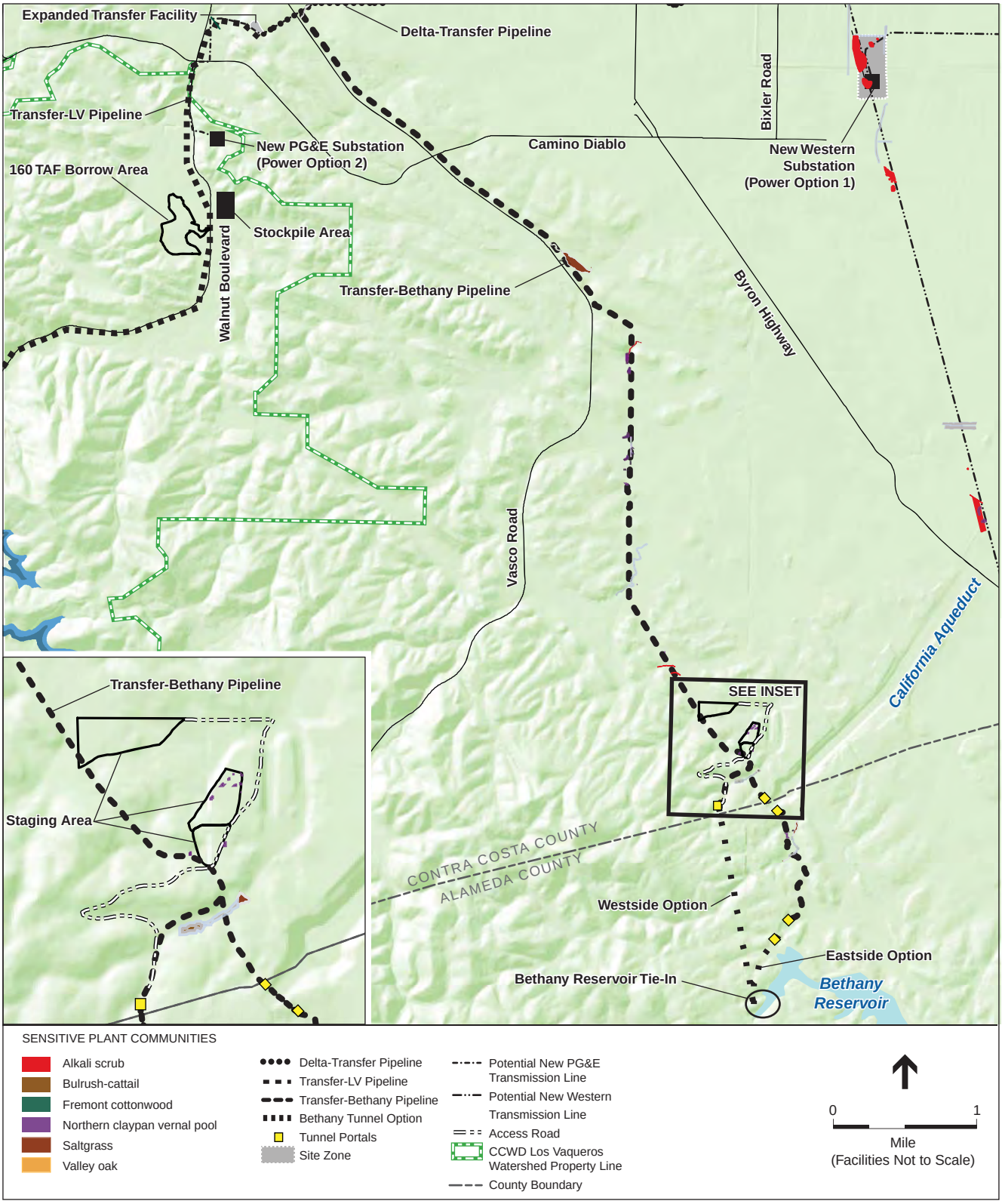



SOURCE: USGS, 1993 (base map); and ESA, 2008



**Figure 4.6-18**

Potential Direct Impacts to Sensitive Plant Communities in the Vicinity of the Delta Intake and Pump Station Facilities and Along the Delta-Transfer Pipeline




SOURCE: USGS, 1993; and ESA, 2008

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

**Figure 4.6-19**

Potential Direct Impacts to Sensitive Plant Communities in the Vicinity of the Transfer-Bethany Pipeline and Western Transmission Line

**TABLE 4.6-9**
**SENSITIVE PLANT COMMUNITY IMPACTS BY PROJECT COMPONENT (ACRES)[a]**

| | Alternatives 1 and 2 | | | Alternative 3 | | | Alternative 4 | | |
|---|---|---|---|---|---|---|---|---|---|
| **Project Component** | **Temporary** | **Permanent** | **Total** | **Temporary** | **Permanent** | **Total** | **Temporary** | **Permanent** | **Total** |
| In-Watershed Facilities | | | | | | | | | |
| Reservoir Inundation Footprint and Dam | | | | | | | | | |
| Blue oak series | 0.00 | 68.61 | 68.61 | 0.00 | 68.61 | 68.61 | 0.00 | 17.55 | 17.55 |
| Bulrush-cattail series | 0.00 | 2.50 | 2.50 | 0.08 | 2.50 | 2.50 | 0.00 | 1.95 | 1.95 |
| Fremont cottonwood series | 0.00 | 0.94 | 0.94 | 0.00 | 0.94 | 0.94 | 0.00 | 0.00 | 0.00 |
| Purple needlegrass series | 0.00 | 0.34 | 0.34 | 0.00 | 0.34 | 0.34 | 0.00 | 0.00 | 0.00 |
| Saltgrass series | 0.00 | 0.08 | 0.08 | 0.00 | 0.08 | 0.08 | 0.00 | 0.08 | 0.08 |
| Valley oak series | 0.00 | 29.15 | 29.15 | 0.00 | 29.15 | 29.15 | 0.00 | 16.42 | 16.42 |
| Valley oak mitigation plantings | 0.00 | 128.03 | 128.03 | 0.00 | 128.03 | 128.03 | 0.00 | 128.03 | 128.03 |
| Blue oak mitigation plantings | 0.00 | 9.02 | 9.02 | 0.00 | 9.02 | 9.02 | 0.00 | 9.02 | 9.02 |
| **Subtotal** | **0.00** | **238.67** | **238.67** | **0.08** | **238.67** | **238.67** | **0.00** | **173.04** | **173.04** |
| Other In-Watershed Facilities [b] | | | | | | | | | |
| Bush seepweed series | 0.38 | 0.00 | 0.38 | 0.38 | 0.00 | 0.38 | 0.38 | 0.00 | 0.38 |
| Blue oak series | 5.73 | 18.79 | 24.53 | 5.73 | 18.79 | 24.53 | 3.25 | 11.84 | 15.09 |
| Bulrush-cattail series | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.09 |
| Fremont cottonwood series | 0.02 | 0.05 | 0.07 | 0.02 | 0.05 | 0.07 | 0.02 | 0.07 | 0.09 |
| Purple needlegrass series | 0.09 | 0.23 | 0.32 | 0.09 | 0.23 | 0.32 | 0.04 | 0.08 | 0.12 |
| Valley oak series | 0.31 | 0.64 | 0.95 | 0.31 | 0.64 | 0.95 | 0.43 | 0.94 | 1.37 |
| Valley oak mitigation plantings | 0.00 | 4.1 | 4.1 | 0.00 | 4.1 | 4.1 | 0.00 | 0.00 | 0.00 |
| **Subtotal** | **6.53** | **19.71** | **26.25** | **6.53** | **19.71** | **26.25** | **4.12** | **13.02** | **17.14** |
| Delta Intake Facilities | | | | | | | | | |
| Bulrush-cattail series | 0.08 | 0.22 | 0.30 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Subtotal** | **0.08** | **0.22** | **0.30** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| Delta-Transfer Pipeline | | | | | | | | | |
| Saltgrass series | 0.30 | 0.00 | 0.30 | 0.30 | 0.00 | 0.30 | 0.00 | 0.00 | 0.00 |
| Valley oak series | 1.63 | 0.00 | 1.63 | 1.63 | 0.00 | 1.63 | 0.00 | 0.00 | 0.00 |
| **Subtotal** | **1.93** | **0.00** | **1.93** | **1.93** | **0.00** | **1.93** | 0.00 | 0.00 | 0.00 |
| Transfer-LV Pipeline | | | | | | | | | |
| Bulrush-cattail series | 0.24 | 0.00 | 0.24 | 0.24 | 0.00 | 0.24 | 0.00 | 0.00 | 0.00 |
| Fremont cottonwood series | 0.11 | 0.00 | 0.11 | 0.11 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 |
| Saltgrass series | 0.22 | 0.00 | 0.22 | 0.22 | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 |
| Valley oak series | 0.10 | 0.00 | 0.10 | 0.10 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 |
| **Subtotal** | **0.67** | **0.00** | **0.67** | **0.67** | **0.00** | **0.67** | **0.00** | **0.00** | **0.00** |
| Transfer-Bethany Pipeline | | | | | | | | | |
| Bulrush-cattail series | 0.23 | 0.00 | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bush seepweed | 0.22 | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Saltgrass series | 0.95 | 0.00 | 0.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Northern claypan vernal pool | 0.86 | 0.00 | 0.86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Subtotal** | **2.26** | **0.00** | **2.26** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| Power Option 1[c] | | | | | | | | | |
| Northern claypan vernal pool | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bulrush-cattail series | <0.1 | 0.00 | <0.1 | <0.1 | 0.00 | <0.1 | 0.00 | 0.00 | 0.00 |
| Bush seepweed | 0.0 | 0.00 | 0.0 | 0.0 | 0.00 | 0.0 | 0.00 | 0.00 | 0.00 |
| **Subtotal** | **<0.1** | **0.00** | **<0.1** | **<0.1** | **0.00** | **<0.1** | **0.00** | **0.00** | **0.00** |

**TABLE 4.6-9 (Continued)**
**SENSITIVE PLANT COMMUNITY IMPACTS BY PROJECT COMPONENT (ACRES)[a]**

| Project Component | Alternatives 1 and 2 | | | Alternative 3 | | | Alternative 4 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Temporary | Permanent | Total | Temporary | Permanent | Total | Temporary | Permanent | Total |
| Power Option 2 [c] | | | | | | | | | |
| Northern claypan vernal pool | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Bulrush-cattail series | <0.1 | 0.00 | <0.1 | <0.1 | 0.00 | <0.1 | 0.00 | 0.00 | 0.00 |
| Bush seepweed | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fremont cottonwood | **<0.1** | 0.00 | **<0.1** | **<0.1** | 0.00 | **<0.1** | 0.00 | 0.00 | 0.00 |
| **Subtotal** | | | | | | | | | |
| Total Impacts to Sensitive Habitats | | | | | | | | | |
| Bush seepweed series | 6.73 | 1.32 | 8.05 | 6.50 | 1.32 | 7.82 | 0.38 | 0.00 | 0.38 |
| Blue oak series | 5.73 | 87.40 | 93.14 | 5.73 | 87.40 | 93.14 | 3.25 | 29.39 | 32.64 |
| Bulrush-cattail series | 1.40 | 2.72 | 4.11 | 1.40 | 2.72 | 4.11 | 0.00 | 2.03 | 2.03 |
| Fremont cottonwood series | 0.18 | 0.99 | 1.18 | 0.18 | 0.99 | 1.18 | 0.02 | 0.07 | 0.09 |
| Northern claypan vernal pool | 0.93 | 0.00 | 0.93 | 0.07 | 0.0 | 0.07 | 0.00 | 0.00 | 0.00 |
| Purple needlegrass series | 0.09 | 0.56 | 0.66 | 0.09 | 0.56 | 0.66 | 0.04 | 0.08 | 0.12 |
| Saltgrass series | 1.48 | 0.08 | 1.56 | 0.52 | 0.08 | 0.60 | 0.00 | 0.08 | 0.80 |
| Valley oak series | 2.03 | 29.79 | 31.83 | 2.04 | 29.79 | 31.83 | 0.43 | 17.36 | 17.79 |
| Valley oak mitigation plantings | 0.00 | 132.13 | 132.13 | 0.00 | 132.13 | 132.13 | 0.00 | 132.13 | 132.13 |
| Blue oak mitigation plantings | 0.00 | 9.02 | 9.02 | 0.00 | 9.02 | 9.02 | 0.00 | 9.02 | 9.02 |

* Notes:
[a] "Temporary" impacts, as used in this analysis, include habitats that would be degraded or similarly impaired, with features being restored *in situ* to emulate pre-project conditions. "Permanent" impacts are those that would permanently destroy features, with compensatory mitigation provided in alternate locations.
[b] Other in-watershed facilities under Alternatives 1, 2, and 3 include the marina, marina access road, borrow area, picnic areas, trailhead parking, westside access road, eastside trail, stockpile area, and parking areas. Facilities under Alternative 4 include the above facilities, and 160-TAF borrow area.
[c] Note that plant community impacts for Power Supply Infrastructure do not include the acreage of features that will be avoided by facilities or spanned by powerlines.

SOURCE: ESA unpublished data, 2006-2008

About 29.15 acres of valley oak series habitat would be inundated and 0.95 acre could be affected by construction of the westside access road and other in-watershed facilities. About 68.61 acres of blue oak series would be affected by inundation, and another 5.73 acres would be temporarily and 18.79 acres permanently affected by construction of the other in-watershed facilities.

Reservoir expansion would permanently flood about 0.34 acre of purple needlegrass series habitat. For other in-watershed facilities, the westside access road would permanently affect 0.23 acre of this habitat and temporarily affect 0.09 acre. The permanent impact area for purple needlegrass habitat includes 0.06 acre that could be periodically affected by wave action along the shoreline during reservoir operations. This impact is considered permanent because it would periodically result in the degradation or removal of grassland throughout the lifetime of reservoir operations.

About 0.38 acre of bush seepweed habitat would also be temporarily affected by construction of in-watershed facilities.

In addition to the above impacts, prior onsite mitigation commitments for terrestrial oak woodland habitat would be removed by grading, dewatering, trenching, and other construction activities related to dam modification and/or permanently flooded due to reservoir expansion to 275 TAF. Permanent habitat losses would include the inundation of 125 acres of mitigation (i.e., planted) valley oak savannah, 3.03 acres of valley oak woodland, and 9.02 acres of blue oak woodland. Additionally, about 4.1 acres of mitigation valley oak savannah would be permanently lost to construction of the dam and associated Inlet/Outlet Pipelines.

### Delta Intake and Pump Station

The new Delta Intake and Pump Station would permanently affect 0.22 acre of bulrush-cattail habitat and temporarily affect 0.08 acre on the banks of Old River.

### Delta-Transfer Pipeline

Small, intermittent stands of saltgrass series habitat (0.30 acre total) are scattered throughout the Delta-Transfer Pipeline alignment (see Figure 4.6-17). Trenching and grading activities would temporarily disturb some areas. After construction is completed, disturbed areas would be restored to pre-project conditions.

Up to 1.63 acres of valley oak riparian vegetation along Kellogg Creek within this pipeline corridor could be temporarily disturbed during grading and trenching to install the pipeline, and restored after project completion. The existing easement is south of the creek, but some disturbance could occur if the construction corridor is constrained by other features.

### Transfer-LV Pipeline

A limited amount of saltgrass series habitat (0.22 acre) in the watershed could be temporarily affected (see Figure 4.6-17) by trenching and grading activities. After construction, disturbed areas would be restored to pre-project conditions.

The pipeline intersection with Kellogg Creek, west of the Transfer Facility, could temporarily affect about 0.11 acre of Fremont cottonwood habitat, 0.24 acre of bulrush-cattail habitat, and 0.10 acre of valley oak habitat, which would be restored after project implementation.

### Transfer-Bethany Pipeline

Roughly 0.23 acre of bulrush-cattail habitat could be temporarily affected along the Transfer-Bethany Pipeline crossings of Brushy Creek and other unnamed drainages along the corridor. Trenching and grading in the vicinity of these streams could also temporarily disturb up to 0.22 acre of bush seepweed vegetation as identified in Table 4.6-9. These areas would be restored after the project is completed.

Saltgrass series habitat (0.95 acre) is present within and right next to sections of this pipeline alignment. Project construction in the vicinity of this habitat could indirectly affect water quality in these features. Ground-disturbing activities such as trenching and grading, vegetation clearing, and construction materials storage could result in the direct loss of habitat and/or degradation of water quality. Seasonal wetlands would be restored wherever feasible, but it may not always be possible to restore all ponds on site; therefore, impacts could be permanent in limited areas.

Surveys identified 0.86 acre of northern claypan vernal pool habitat in the Transfer-Bethany Pipeline study area. For the purpose of this impact analysis it is presumed that this project component would temporarily affect up to 0.86 acre of northern claypan vernal pool habitat. These areas would be restored after the project is completed.

### Power Supply Infrastructure

**Power Option 1: Western Only.** Under Option 1, the proposed 69-kilovolt double-circuit powerline alignment would traverse primarily agricultural areas in use for crops, irrigated pasturelands, and grazed annual grasslands. Several portions of the Western powerline alignment support Natural Seasonal Wetlands (bulrush-cattail, bush seepweed, northern claypan vernal pool) that would be spanned by powerlines. These areas are north and east of the Western substation siting zone (see Figure 4.6-18). Natural Seasonal Wetland habitat (bush seepweed) was also identified at the proposed Western substation site. Due to flexibility in facilities siting, the Western substation location would be sited within the study area to avoid and minimize impacts to sensitive plant communities.

It is expected that sensitive plant communities would be avoided by project design, largely by spanning Natural Seasonal Wetland habitats with powerlines. Although no sensitive plant community impacts are expected, Mitigation Measure 4.6.1b will be implemented to ensure that final siting plans consider, minimize, and avoid impacts to sensitive plant communities.

**Power Option 2: Western and PG&E.** As with Option 1, under this option the proposed 69-kilovolt double-circuit powerline alignment would traverse primarily agricultural areas in use for crops, irrigated pasturelands, and grazed annual grasslands, spanning Natural Seasonal Wetlands (bulrush-cattail, bush seepweed, northern claypan vernal pool). Because no sensitive plant

communities exist in the area of the proposed PG&E substation or powerline (ESA, 2008b), no impacts would occur to sensitive plant communities.

#### Summary for Alternative 1

Under Alternative 1, the project would directly impact sensitive plant communities within and outside the Los Vaqueros Watershed, and affect mitigation plantings that compensated for impacts from the existing Los Vaqueros Reservoir. Blue oak woodlands and valley oak woodlands would see the greatest impacts by area; however, impacts would also be incurred to seasonal wetlands and native grassland habitat. These impacts would be significant prior to mitigation, but can be mitigated to a less-than-significant level through the incorporation of onsite and offsite mitigation. Mitigation Measure 4.6.1a seeks to avoid and minimize impacts to sensitive plant communities, and Mitigation Measure 4.6.1b provides compensation for impacts through habitat creation, enhancement, and preservation of affected sensitive plant communities.

As a component of Alternative 1, water flows in Kellogg Creek would bypass the dam construction site, thus, specific mitigation is not required to provide flows to maintain riparian habitat in Kellogg Creek.

### *Alternative 2*

Potential impacts to sensitive plant communities under Alternative 2 would be the same as those discussed for Alternative 1 and are considered significant before the implementation of mitigation measures. Project impacts, organized by facility and alternative, are presented in Table 4.6-9.

Alternative 2-related impacts would be reduced to a less-than-significant level through the implementation of Mitigation Measures 4.6.1a and 4.6.1b.

### *Alternative 3*

Alternative 3 would result in most of the same impacts described for Alternative 1, except that this alternative does not include construction of the new Delta Intake and Pump Station or the Transfer-Bethany Pipeline. Therefore, this alternative would impact 2.34 fewer acres of sensitive plant communities than Alternative 1.

Instead of the new Delta Intake and Pump Station, this alternative includes the Old River Intake and Pump Station Expansion. However, there would be no physical disruption either on land or in the Old River channel associated with expansion of this facility, and thus no additional impact to sensitive plant communities associated with this alternative.

Impacts to sensitive plant communities resulting from implementation of Alternative 3 would be significant prior to the implementation of mitigation measures. These impacts would be reduced to a less-than-significant level through the implementation of Mitigation Measures 4.6.1a and 4.6.1b.

### *Alternative 4*

A 160-thousand-acre-feet (TAF) reservoir expansion and construction of in-watershed facilities would result in permanent losses to the same sensitive plant communities as Alternative 1 (except for Northern claypan vernal pool habitat), but to a reduced extent because of its reduced inundation area and elimination of new pipelines. Because the reservoir would not be fully drained for construction under this alternative, there would be no disruption of reservoir releases downstream to Kellogg Creek. Thus, providing water to this area through a bypass system would be unnecessary.

Permanent impacts to bulrush-cattail habitat plant communities would occur as a result of dam construction (1.95 acres) and other in-watershed facilities (0.09 acre). Saltgrass series habitat (0.08 acre) would be permanently affected in association with stock ponds and channels that would be inundated by reservoir expansion. About 16.42 acres and 17.55 acres of valley oak and blue oak series habitat, respectively, would be permanently impacted by reservoir expansion. Other in-watershed facilities could temporarily impact 0.43 acre of valley oak and permanently impact 0.94 acres. Also, 3.25 acres of blue oak could be temporarily impacted and 11.84 acres permanently impacted by in-watershed facilities under this alternative. Similar to the other alternatives, in-watershed facilities would temporarily impact 0.38 acre of bush seepweed series habitat. The westside access road and eastside trail for Alternative 4 would temporarily impact 0.02 acre and permanently impact 0.07 acre of Fremont cottonwood series habitat and the westside access road would impact 0.12 acre of purple needlegrass series habitat (0.04 acre temporary, 0.08 acre permanent).

Onsite mitigation commitments for terrestrial oak woodland habitat would also be impacted by reservoir expansion to 160 TAF. Permanent habitat losses would include the inundation of 125 acres of mitigation (i.e., planted) valley oak savannah, 3.03 acres of valley oak woodland, and 9.02 acres of blue oak woodland.

The 160-TAF borrow area does not support sensitive plant communities; thus, no impacts are anticipated from this project element.

Under Alternative 4, the project would have fewer permanent and temporary effects upon sensitive plant communities compared with Alternative 1, but impacts would remain significant prior to mitigation. Alternative 4 would have less impact upon valley oak and blue oak series habitat (17.79 acres and 32.64 acres for Alternative 4 versus 31.83 acres and 93.14 acres for Alternative 1, respectively), bulrush-cattail habitat (2.03 acres versus 4.11 acres), bush seepweed habitat (0.38 acre versus 8.05 acres), saltgrass series habitat (0.8 acre versus 1.6 acre), Fremont cottonwood series (0.09 acre versus 1.18 acre) and purple needlegrass series habitat (0.12 acre versus 0.66 acre). Impacts to oak mitigation plantings and commitments would be comparable under both alternatives. The implementation of Mitigation Measures 4.6.1a and 4.6.1b would reduce project impacts to a less-than-significant level.

### Mitigation Measures

The distribution and extent of sensitive plant communities has been mapped and documented for all project facilities, both within and outside the watershed. Mitigation Measures 4.6.1a and 4.6.1b include sensitive resource avoidance, impact minimization, restoration of temporarily disturbed sensitive plant communities, and compensation for permanent, unavoidable losses through restoration, enhancement, creation, and preservation; implementation of these measures would reduce the impacts on sensitive plant communities from construction of all facilities to a less-than-significant level. Compensation measures presented in this section have been integrated into a comprehensive biological resources mitigation and compensation program, which is presented in Section 4.6.3.

**Measure 4.6.1a:** Based on the documented distribution of sensitive plant communities, CCWD shall implement avoidance and minimization measures to minimize impacts on sensitive plant communities during project construction. To the extent feasible, project design shall minimize impacts on sensitive plant communities. Exclusion and/or silt fencing shall be installed to buffer avoided areas.

Natural Seasonal Wetland habitat (bush seepweed) shall be avoided within the Western substation study area by siting facilities to avoid to this plant community.

**Measure 4.6.1b:** Where avoidance of sensitive plant communities is not possible, CCWD shall provide compensation through habitat creation, enhancement, and preservation, both within and outside the watershed, for temporary and permanent impacts on the following sensitive plant communities that will be affected by the project:

*Natural Seasonal Wetland (Bulrush-cattail Series, Northern Claypan Vernal Pool, Bush Seepweed, and Saltgrass Series)*

- CCWD shall implement Mitigation Measure 4.6.2, presented below, to minimize, and compensate for impacts to sensitive plant communities associated with jurisdictional wetlands and other waters of the United States.

*Valley Oak, Blue Oak Woodlands, and Fremont Cottonwood Series*

- CCWD shall develop an oak woodland mitigation and monitoring plan to outline mitigation and monitoring obligations for impacts resulting from increased reservoir levels and construction activities. This plan shall include restoration, enhancement, and/or preservation sites; thresholds of success; monitoring and reporting requirements; site-specific designs for site restoration/enhancement activities; and long-term maintenance activities as set forth in the following bullets.

- Under the oak woodland mitigation and monitoring plan, CCWD shall acquire or dedicate land suitable for blue oak woodland and riparian woodland (valley oak and Fremont cottonwood series) restoration, enhancement, and preservation. If restoration is feasible, then a ratio of at least 2:1 shall be used. If preservation (with enhancement) is used, at least a 3:1 ratio shall be implemented to offset losses.

- Due to the limited availability of suitable mitigation lands in the watershed, CCWD shall purchase blue oak mitigation lands outside of the watershed.

- CCWD shall coordinate acquisition of woodland mitigation lands with USFWS to minimize potential conflicts with regional San Joaquin kit fox planning efforts, which seek to maintain open grasslands movement corridors.

- CCWD shall submit the mitigation and monitoring plan to the appropriate regulatory agencies for approval.

*Purple Needlegrass Grasslands*

- CCWD shall seed disturbed areas within this habitat area with native grass seed collected within or in the vicinity of impacts. Additional seed could be used to supplement seed mixes, but seed shall be from locally collected (within the ecoregion) source material and shall be appropriately selected for site conditions.

- Consistent with MSCS guidance (CALFED, 2000) and coordination with CDFG and USFWS, mitigation for loss of this plant community shall be provided by preservation and enhancement of mitigation lands at a minimum of a 2:1 mitigation ratio to compensate for permanent losses.

- CCWD shall develop and implement a native grassland restoration and enhancement plan to identify potential seed collection sites, quantities of seed required, potential enhancement areas within the Los Vaqueros Watershed, potential enhancement activities, and other measures required to maintain the sustainability of native grassland restoration and enhancement areas.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.2: Project construction could affect potentially jurisdictional wetlands or waters, and streambeds and banks regulated by CDFG. (Less than Significant with Mitigation)**

Before disturbing any jurisdictional water features, CCWD would obtain all required permit approvals from USACE, CDFG, Regional Water Quality Control Board (RWQCB), and all other agencies with permitting responsibilities for construction activities within jurisdictional waters.

### *Alternative 1*

Wetlands and other waters of the United States or the State of California under regulatory jurisdiction of USACE, RWQCB, and/or CDFG occur in and near the study area (see **Table 4.6-10**; **Figure 4.6-20**, **Figure 4.6-21**, **Figure 4.6-22**, **Figure 4.6-23**). A discussion of potential impacts on sensitive aquatic habitat (e.g., Fremont cottonwood habitat) is provided above under Impact 4.6.1.

**TABLE 4.6-10**
**WETLAND IMPACTS BY PROJECT COMPONENT**

| Project Component | Temporary Impacts* | Permanent Impacts | Total Impact to Section 404 Jurisdictional Area (Acres) |
|---|---|---|---|
| ALTERNATIVES 1 AND 2 | | | |
| In-watershed Facilities | | | |
| **Reservoir Inundation Footprint and Dam** | | | |
| Nontidal Freshwater Permanent Emergent | 0.0 | 2.50 (16 Features) | 2.50 |
| Natural Seasonal Wetland | 0.0 | 1.79 (26 Features) | 1.79 |
| Valley/Foothill Riparian | 0.0 | 0.24 (1 Feature) | 0.24 |
| Lacustrine (Pond) | 0.0 | 1.23 (3 Features) | 1.23 |
| **Subtotal** | **0.0** | **5.76 (46 Features)** | **5.76** |
| **Other In-watershed Facilities** | | | |
| Nontidal Freshwater Permanent Emergent | 0.02 (1 Feature) | 0.04 (1 Feature) | 0.06 |
| Natural Seasonal Wetland | 0.0 | 0.06 (3 Features) | 0.06 |
| Valley/Foothill Riparian | 0.0 | 0.0 | 0.0 |
| Lacustrine | 0.0 | 0.02 (1 Feature) | 0.02 |
| **Subtotal** | **0.02** | **0.12** | **0.14** |
| **In-watershed Total** | **0.02** | **5.88** | **5.90** |
| **New Delta Intake and Pump Station** | 0.50 | 0.29 | 0.79 |
| **Delta-Transfer Pipeline** | 2.97 | 0.0 | 2.97 |
| **Transfer-LV Pipeline** | 0.67 | 0.0 | 0.67 |
| **Transfer-Bethany Pipeline** | 3.03 | 0.86 | 3.89 |
| **Power Supply Infrastructure (Options 1 and 2)** | <0.1 | <0.1 | <0.1 |
| **Prior Wetland Commitments** | | | |
| Valley/Foothill Riparian | 0.0 | 3.05 | 3.05 |
| **Freshwater Emergent Wetland** | 0.0 | 1.57 | 1.57 |
| **Total** | **7.29** | **11.75** | **18.94** |
| ALTERNATIVE 3 | | | |
| In-watershed Facilities (same as Alternative 1) **Subtotal** | **0.0** | **5.76 (46 Features)** | **5.76** |
| **Other In-watershed Facilities Subtotal (same as Alternative 1)** | **0.02** | **0.12** | **0.14** |
| **Old River Intake and Pump Station Expansion** | 0.0 | 0 | 0 |
| **Delta-Transfer Pipeline** | 2.97 | 0.0 | 2.97 |
| **Transfer-LV Pipeline** | 0.67 | 0.0 | 0.67 |
| **Power Supply Infrastructure (Options 1 and 2)** | <0.1 | <0.1 | <0.1 |
| **Prior Wetland Commitments** | | | |
| Valley/Foothill Riparian | 0.0 | 3.05 | 3.05 |
| **Freshwater Emergent Wetland** | 0.0 | 1.57 | 1.57 |
| **Total** | **3.76** | **10.60** | **14.26** |

**TABLE 4.6-10 (Continued)**
**WETLAND IMPACTS BY PROJECT COMPONENT**

| Project Component | Temporary Impacts* | Permanent Impacts | Total Impact to Section 404 Jurisdictional Area (Acres) |
|---|---|---|---|
| ALTERNATIVE 4 | | | |
| In-watershed Facilities | | | |
| **Reservoir Inundation Footprint and Dam** | | | |
| Nontidal Freshwater Permanent Emergent | 0.0 | 1.95 (13 Features) | 1.95 |
| Natural Seasonal Wetland | 0.0 | 0.71 (16 Features) | 0.71 |
| Lacustrine | 0.0 | 0.82 (2 Features) | 0.82 |
| **Subtotal** | **0.0** | **3.48** | **3.48** |
| **Other In-watershed Facilities** | | | |
| Nontidal Freshwater Permanent Emergent | 0.0 | 0.09 | 0.09 |
| Natural Seasonal Wetland | 0.03 | 0.05 | 0.08 |
| Valley/Foothill Riparian | 0.01 | 0.03 | 0.04 |
| Lacustrine | 0.0 | 0.0 | 0.0 |
| **Subtotal** | **0.04** | **0.17** | **0.21** |
| **Total** | **0.04** | **3.65** | **3.69** |

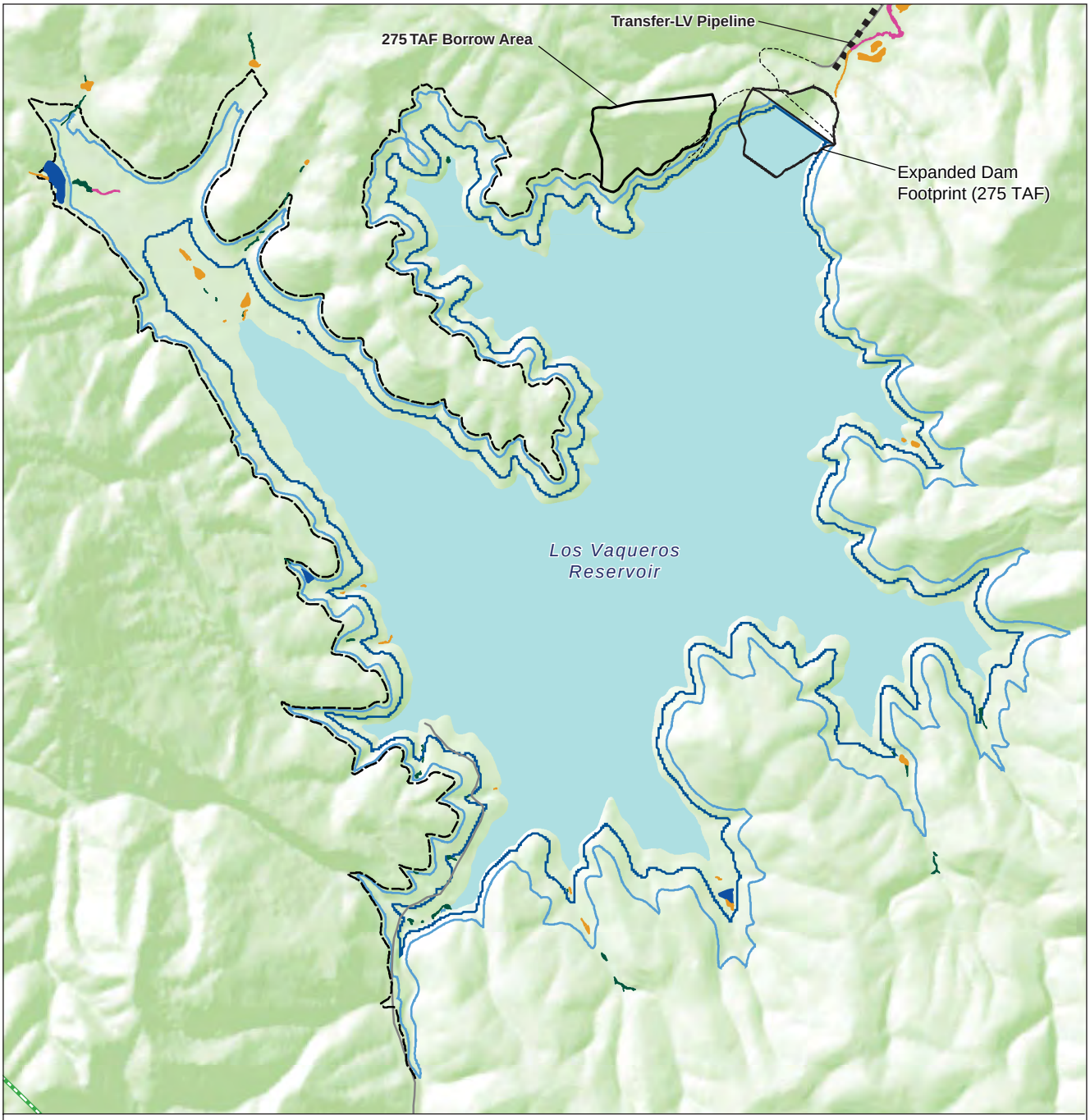
* "Temporary" impacts, as used in this wetlands analysis, include those that would partially or fully alter wetland features, with features being restored or recreated in situ to emulate pre-project conditions. "Permanent" impacts are those that would result in the permanent loss of wetland features with compensatory mitigation provided at alternate locations.

SOURCE: ESA unpublished data, 2006-2008

### Los Vaqueros Reservoir Expansion, Other In-watershed Facilities, and Recreational Facilities

Potential jurisdictional features in the watershed study area include one perennial channel (Lower Kellogg Creek), nine intermittent channels (including Upper Kellogg Creek, Adobe Creek, Mallory Creek, Fig Pig Gulch, Savannah Creek, Buckeye Canyon, Horseshoe Creek, and several unnamed drainages), 123 ephemeral channels (including Lost Cave Creek, Mariposa Creek, and Silva Creek), 5 ponds, 56 permanent emergent wetlands, 51 natural seasonal wetlands, and 27 riparian wetlands. Results of the delineation identified a total of 57.4 acres of wetlands and "other waters" in the watershed study area.

Expansion of the reservoir and construction of other in-watershed facilities would result in the permanent fill of 5.88 acres and temporary fill of 0.02 acre of potentially jurisdictional wetlands or other waters of the United States (Table 4.6-10; Figure 4.6-20 and Figure 4.6-21). "Temporary" impacts, as used in this wetlands analysis, include those that would partially or fully alter wetland features, with features being restored or recreated *in situ* to emulate pre-project conditions. "Permanent" impacts are those that would permanently inundate wetland features with compensatory mitigation provided in alternate locations.

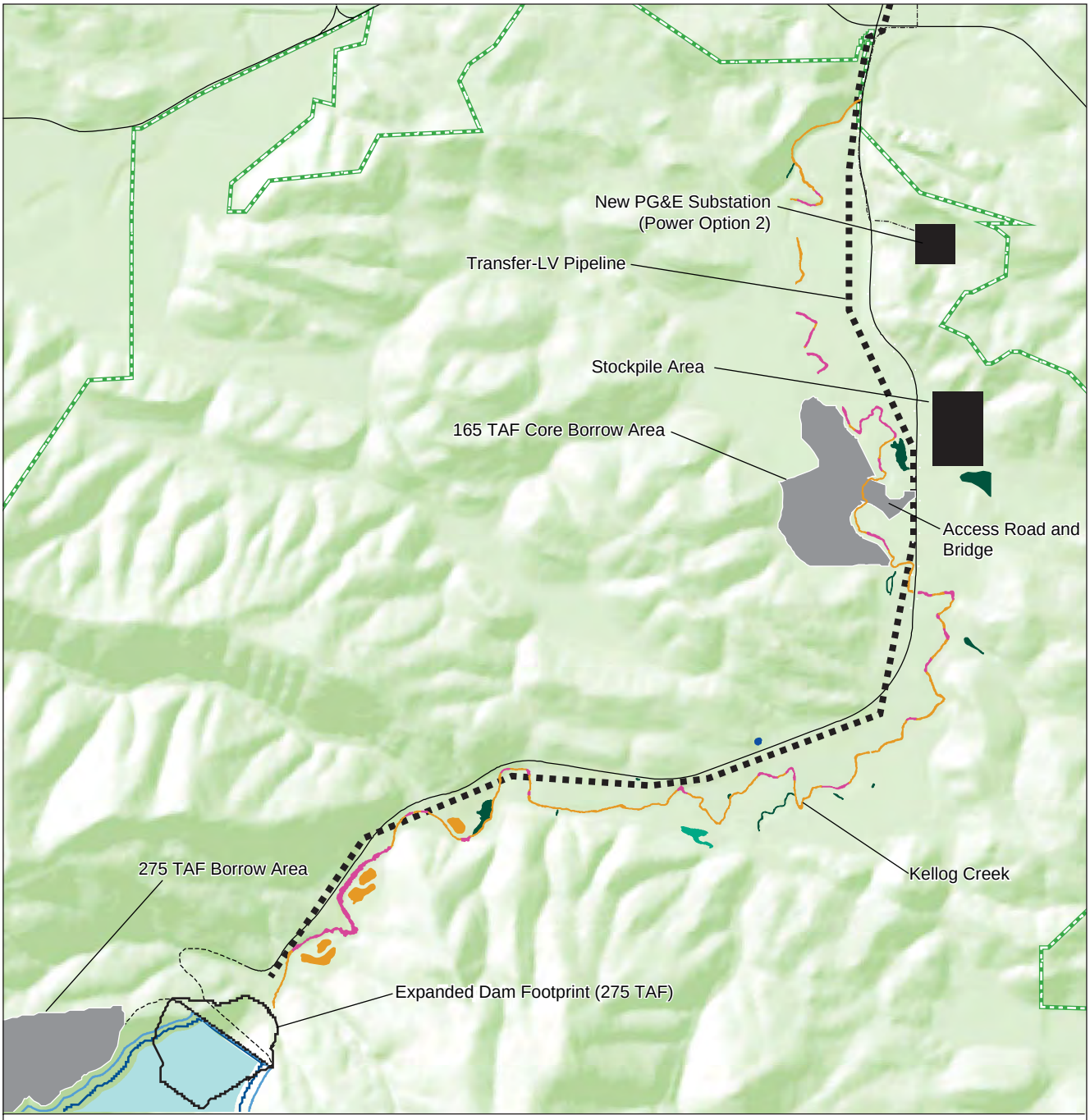



SOURCE: USGS, 1993 (base map); ESRI, 2006; CCWD, 2007; CCC, 2007; MWH, 2007; and ESA, 2007

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

**Figure 4.6-20**

Potentially Jurisdictional Wetlands in the Vicinity of the Los Vaqueros Reservoir




SOURCE: USGS, 1993 (base map); and ESA, 2007

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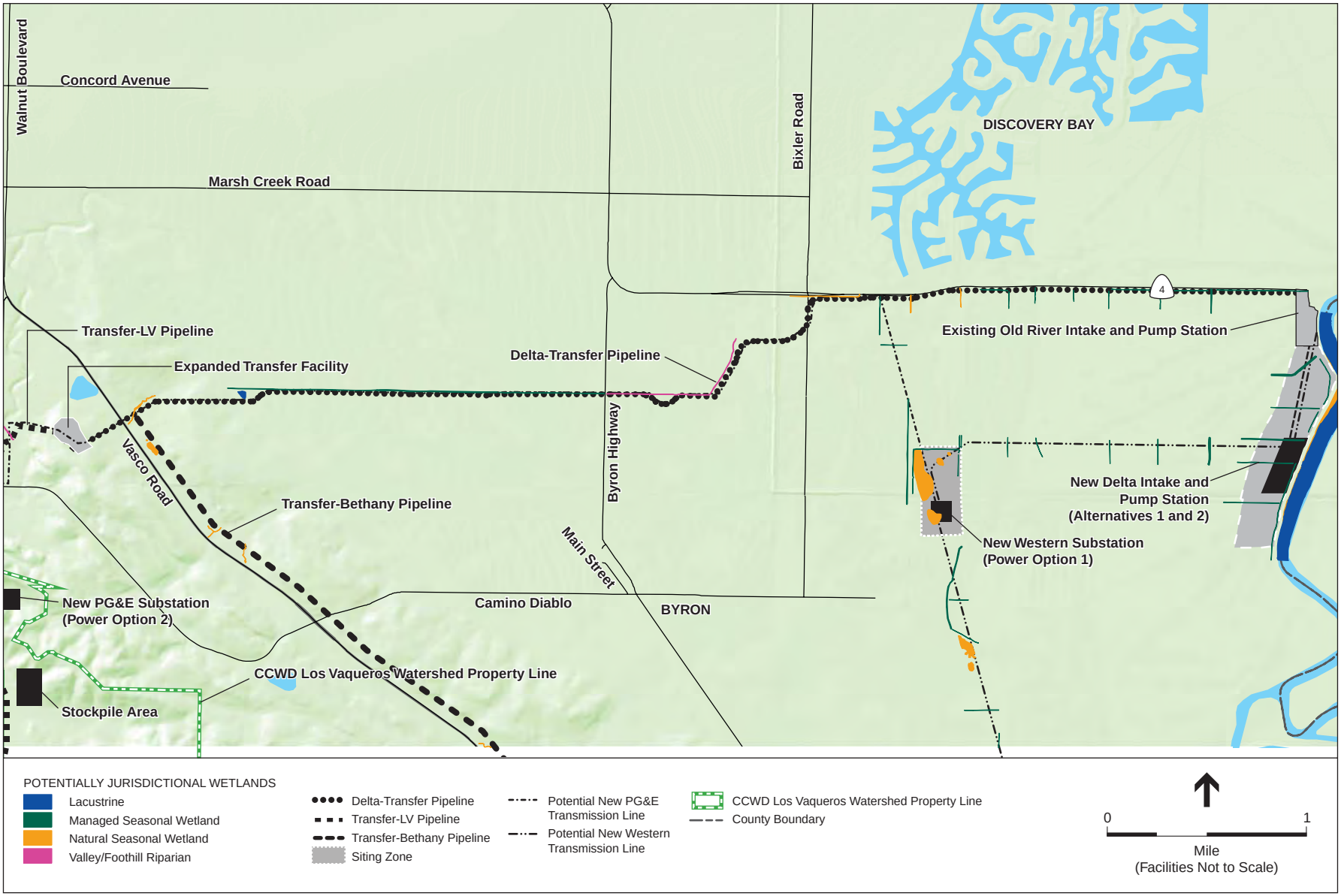
**Figure 4.6-21**

Potentially Jurisdictional Wetlands in the Vicinity of Other In-Watershed Facilities




SOURCE: USGS, 1993 (base map); and ESA, 2008

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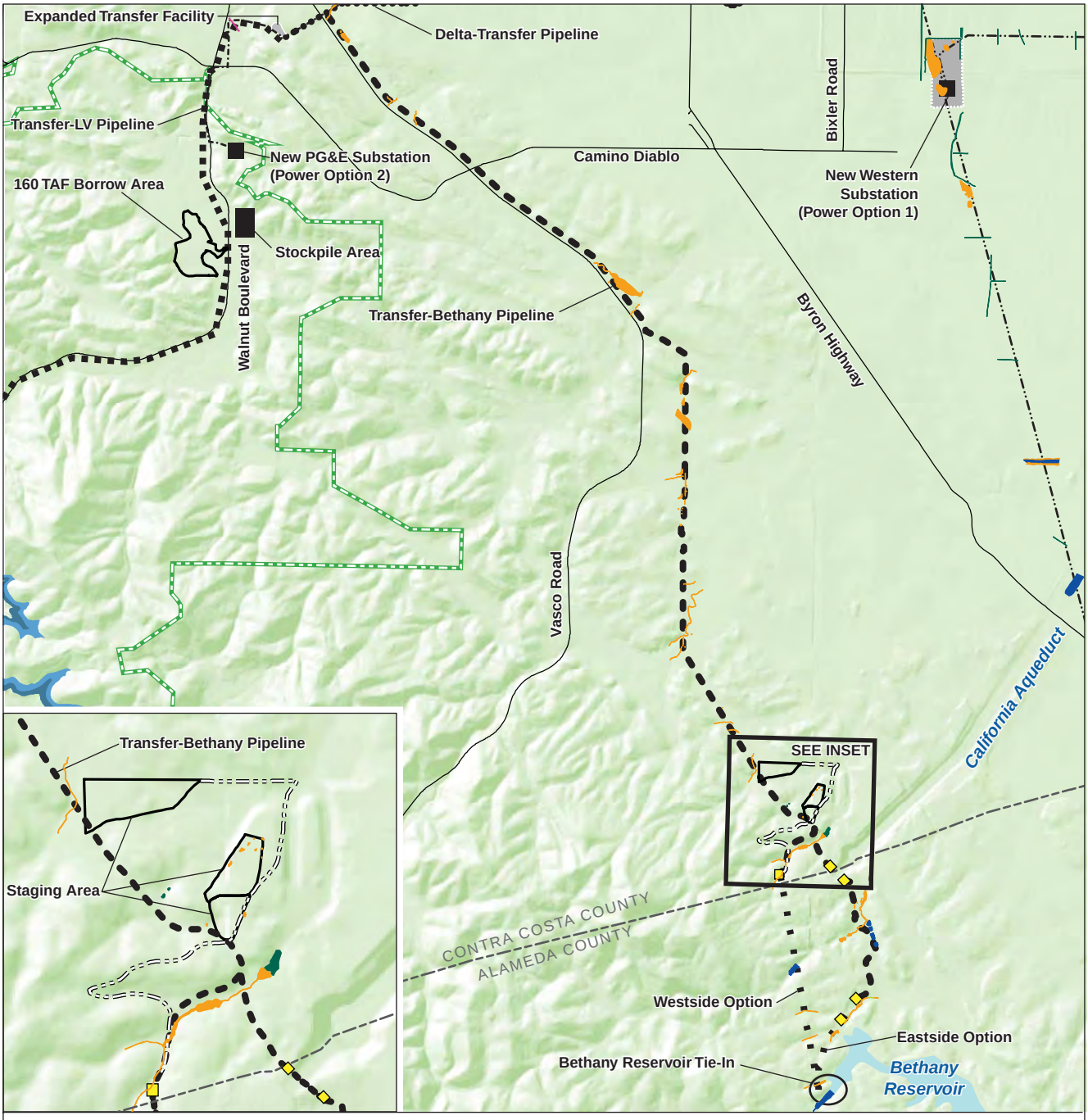
**Figure 4.6-22**

Potential Jurisdictional Wetlands in the Vicinity of the Delta Intake and Pump Station Facilities and Along the Delta-Transfer Pipeline




SOURCE: USGS, 1993; and ESA, 2008

Los Vaqueros Reservoir Expansion Project EIS/EIR . 201110

**Figure 4.6-23**

Potentially Jurisdictional Wetlands in the Vicinity of the Transfer-Bethany Pipeline and Western Transmission Line

About 0.78 acre of the prior onsite wetland mitigation commitments for riparian habitat would be permanently flooded to accommodate an increase in reservoir levels to 275 TAF. In addition, about 2.27 acres of riparian mitigation habitat would be disturbed by grading, dewatering, trenching, and other construction activities within the Inlet/Outlet Pipelines construction area.

About 1.57 acres of the prior onsite mitigation commitments for freshwater emergent wetland habitat would be permanently inundated by reservoir expansion, as follows: (1) the spring mitigation site, which has one 0.15-acre emergent marsh; (2) the Clear Lake mitigation site, which has four emergent marsh features totaling 1.24 acres; and (3) the Canyon mitigation site, which has one 0.18-acre emergent marsh.

### New Delta Intake and Pump Station

The new Delta Intake and Pump Station would permanently impact about 0.1 acre of emergent wetlands (cattail) habitat on the west bank of Old River. The new intake and fish screen would be 182 feet long and would impact about 0.13 acre of open water (182 feet by 30 feet). Additionally, the facility footprint would impact about 0.1 acre of emergent wetlands in engineered irrigation canals and ditches within agricultural portions of the project area. Temporary impacts to about 0.5 acre of open water would result from sheet-pile installation and dewatering of the construction area, and from excavation around the expanded fish screen intake.

### Delta-Transfer Pipeline

Eight drainages cross along the Delta-Transfer pipeline alignment. Of these, four are small, maintained irrigation channels that do not support emergent vegetation and are likely not jurisdictional. The alignment traverses four blue-line[5] drainages. Of these, two are large, maintained, unvegetated drainage ditches near the town of Discovery Bay where the alignment parallels SR 4. These potentially jurisdictional features are about 15 feet wide, with an initial anticipated impact of 0.07 acre each. The other two features are alkali wetlands, one from the above-described area and the other just east of Vasco Road. The first of these features is a deep, trapezoidal channel that supports iodine bush, saltgrass, and a few willows. This feature measures about 40 feet across at the top of the bank and 15 feet at ordinary high water. The anticipated impact to jurisdictional wetlands at this site would be about 0.07 acre. The second feature, the blueline drainage near Vasco Road, supports a broad alkali swale dominated by saltgrass and saltbush (*Atriplex* sp.) that varies in width from an estimated 10 feet to 40 feet. The total anticipated impact to this feature is 2.97 acres.

After pipeline installation, the drainage features would be restored on site. No access vaults would be installed within the jurisdictional drainages that occur along the pipeline corridor. Thus, installation of the pipeline would result in the temporary impacts of 2.97 acre and no permanent impacts to potential jurisdictional features.

[5] A *blue-line* stream is one that flows for most or all of the year and is distinguished on U.S. Geological Survey topographic maps with a solid blue line.

### Expanded Transfer Facility

No potentially jurisdictional features were identified in the Expanded Transfer Facility study area; therefore, no impacts are anticipated at this location.

### Transfer-LV Pipeline

The Transfer-LV Pipeline alignment traverses Kellogg Creek at six locations, of which five are within the watershed. The character of Kellogg Creek varies between crossing sites, with two sites showing ephemeral flows and four sites supporting perennial water.

Of the two locations with ephemeral conditions, one is between the Transfer Station Facility and Walnut Boulevard, and the other is in the watershed, north of CCWD's administrative office. These locations are generally unvegetated (or indistinct from surrounding upland non-native grassland), but are steeply incised. Construction methods are open trench construction at all crossing locations.

Kellogg Creek demonstrates perennial conditions at four crossing locations in the watershed. These areas support some willow scrub and scattered oaks but portions of the banks are unvegetated except for non-native annual grasses and ruderal species.

Installation of the pipeline would result in temporary impacts to 0.67 acre and no permanent impacts to potential jurisdictional features. Kellogg Creek would be avoided within the remainder of the construction right-of-ways.

### Transfer-Bethany Pipeline

Fifteen potentially jurisdictional drainages are on the Transfer-Bethany Pipeline alignment, including Brushy Creek (at Armstrong Road), six small, ephemeral unnamed drainages tributary to Brushy Creek, and eight unnamed tributaries to various unnamed channels in the Delta. Of these, five unnamed features are characterized as intermittent alkali swales that generally support saltbush (*Atriplex* sp.), saltgrass, and associated saline-adapted species. These intermittent features vary in width from narrow incised channels to broad alkaline meadows greater than 40 feet wide. Another five unnamed intermittent drainages are generally unvegetated (or indistinct from surrounding upland non-native grassland), but are incised. Lastly, the alignment crosses Brushy Creek where the drainage crosses Armstrong Road. Brushy Creek is an intermittent stream that is somewhat degraded due to cattle access. Brushy Creek supports some cattails (*Typha* sp.) but portions of the banks are unvegetated except for non-native annual grasses and ruderal species.

Installation of the pipeline would result in estimated temporary impacts to 3.03 acres of wetland and permanent impacts to twelve seasonal pools or topographic depressions totaling 0.86 acre that occur in or next to the Transfer-Bethany Pipeline.

### Power Supply Infrastructure

**Power Option 1: Western Only.** Agricultural irrigation ditches and small seasonal wetlands are present throughout the Western powerline alignment. The proposed Western substation and powerlines occur primarily in existing agricultural areas, in use for crops, irrigated pasturelands, and

grazed annual grasslands. Jurisdictional wetlands were identified on the Western substation study area. Because the study area is larger than the footprint, the proposed substation can be sited to avoid impacts to Natural Seasonal Wetlands based on 2008 wetland and rare plant survey findings.

**Power Option 2: Western and PG&E.** Agricultural irrigation ditches and small seasonal wetlands are present throughout the Western powerline alignment and would be spanned without impact.

Kellogg Creek is the only identified jurisdictional wetland in the PG&E study area. Powerlines would traverse the creek at two locations and poles would be sited outside of the creek corridor. Wetlands do not occur at the PG&E substation site. Therefore, wetland impacts are not anticipated from the PG&E substation and distribution line.

#### Summary for Alternative 1

Under Alternative 1, the project would directly impact wetland features both within and outside the Los Vaqueros Watershed and would affect mitigation wetlands created to compensate for the existing Los Vaqueros Reservoir. Within the watershed, Permanent Emergent Wetlands would experience the greatest permanent impacts by area (2.54 acres in 17 features). Permanent impacts would also be incurred to Natural Seasonal Wetlands (1.85 acres in 29 features), Riparian Wetlands (0.24 acre in one feature) and Lacustrine Wetlands (1.25 acre in 4 features). Impacts related to Alternative 1 would be significant prior to mitigation, but can be mitigated to a less-than-significant level through the incorporation of avoidance strategies, Best Management Practices, and onsite and offsite compensatory mitigation. Temporary impacts would be eliminated by site restoration and by removal of the cofferdam at the completion of in-channel work for the new Delta Intake and Pump Station. Impacts associated with Alternative 1 would be reduced to a less-than-significant level through the implementation of Mitigation Measure 4.6.2a, which seeks to avoid and minimize effects to wetlands and other waters to the greatest extent practicable and Mitigation Measure 4.6.2b, which provides compensation for impacts through wetland restoration or creation.

### *Alternative 2*

Potential impacts to jurisdictional wetlands and waters, or streambeds and banks under Alternative 2 would be the same as those discussed for Alternative 1. These impacts are significant before the implementation of mitigation measures. Impacts would be reduced to a less-than-significant level through implementation of Mitigation Measures 4.6.2a and 4.6.2b.

### *Alternative 3*

This alternative involves expansion of the Old River Intake and Pump Station and does not include construction of the new Delta Intake and Pump Station or the Transfer-Bethany Pipeline. Potential impacts to jurisdictional wetlands, waters of the United States, or streambeds and banks under Alternative 3 would be the same as those discussed for Alternative 1 with respect to the 275 TAF reservoir expansion and other in-watershed facilities, but less overall without the new Delta Intake and Pump Station and Transfer-Bethany Pipeline. Under this alternative, expansion

of the Old River Intake and Pump Station would not involve physical site modification or disturbance on either the land or in the water, so there would be no impact to wetlands or waters at that project site. As shown in Table 4.6-10, total temporary impact would be 3.76 acres and the permanent effect would be 10.60 acres, compared to 7.29 acres temporary and 11.75 acres permanent impact for Alternative 1.

Anticipated impacts to jurisdictional wetlands and other waters of the United States are considered significant prior to mitigation. Impacts would be reduced to a less-than-significant level through implementation of Mitigation Measures 4.6.2a and 4.6.2b.

### *Alternative 4*

Alternative 4 would result in much less impact to wetlands and waters than Alternative 1 because this alternative does not include many of the facilities required under Alternative 1 (i.e., no new or expanded pump station, no physical expansion of the Transfer Facility, and no new pipeline or electrical transmission facilities). Alternative 4 would result in the permanent fill or inundation of 3.65 acres of potentially jurisdictional wetlands or other waters of the United States and 0.04 acre of temporary impacts (Table 4.6-10), compared to 11.75 acres permanent and 7.29 acres of temporary impacts associated with Alternative 1.

Jurisdictional wetlands are not present in the 160-TAF borrow area. A temporary bridge crossing over Kellogg Creek would be required to provide equipment access to the borrow site. Stream intrusion would be minimal with installation activities performed on the top of the bank. The area of stream that would be shaded during borrow activities is estimated to be 0.1 acre (8 feet by 60 feet).

Bulrush-cattail and saltgrass series habitat (alkali marsh) at the Kellogg Creek wetland mitigation sites would be affected during construction. Mitigation wetlands would be filled and/or graded to accommodate construction activities within the construction area for the Inlet/Outlet Pipelines. About 0.78 acre of the onsite mitigation commitments for riparian habitat and 1.24 acres of emergent marsh would be permanently flooded by the expanded 160 TAF reservoir. In addition, about 2.27 acres of riparian mitigation habitat would be disturbed by grading, trenching, and other construction activities for the Inlet/Outlet Pipelines.

This impact is significant prior to mitigation. The implementation of Measures 4.6-2a, which seeks to avoid and minimize effects to wetlands and other waters to the greatest extent practicable, and Measure 4.6-2b, which includes mitigation for impacts to jurisdictional features, would reduce the impacts to a less-than-significant level.

#### Mitigation Measures

> **Measure 4.6.2a:** Final project design shall avoid and minimize the fill of wetlands and other waters to the greatest practicable extent. Areas that are avoided shall be subject to best management practices under the General National Pollutant Discharge Elimination System Permit, as described in **Measure 4.5.1**.

The fill of wetlands at the proposed Western substation site shall be avoided by siting facilities within the study area so as to avoid impacts to such areas.

**Measure 4.6.2b:** Where jurisdictional wetlands and other waters cannot be avoided, to offset temporary and permanent impacts that would occur as a result of the project, restoration and compensatory mitigation shall be provided through the following mechanisms:

1. Purchase or dedication of land to provide wetland preservation, restoration or creation. If restoration is available and feasible, then a ratio of at least 2:1 shall be used. If a wetland needs to be created, at least a 3:1 ratio shall be implemented to offset losses. Where practical and feasible, onsite mitigation shall be implemented.

2. A wetland mitigation and monitoring plan shall be developed by a qualified biologist in coordination with CDFG, USFWS, USACE, and/or RWQCB that details mitigation and monitoring obligations for temporary and permanent impacts to wetlands and other waters as a result of construction activities. The plan shall quantify the total acreage lost, describe mitigation ratios for lost habitat, annual success criteria, mitigation sites, monitoring and reporting requirements, and site specific plans to compensate for wetland losses resulting from the project.

3. The mitigation and monitoring plan shall be submitted to the appropriate regulatory agencies for approval.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.3: Project construction could affect populations of special-status plant species including brittlescale, San Joaquin spearscale, Brewer's dwarf-flax, and rose-mallow. (Less than Significant with Mitigation)**

The dates and findings of focused botanical surveys in the project study areas are presented in Table 4.6-3.

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

Based on focused surveys, one special-status plant species was identified in oak woodland and upland scrub habitats that could be directly affected by reservoir inundation. Areas west of the reservoir support a 101.4-acre population of Brewer's dwarf-flax (see Figure 4.6-12). Portions of the population composed of an unknown number of individual plants would be affected by relocation of the westside access road (1.0 acre) and inundation (0.13 acre).

A brittlescale population consisting of about 25 plants was identified south of the proposed staging and stockpile area (ESA, 2007; see Figure 4.6-12). A San Joaquin spearscale population was also verified south of the proposed staging and stockpile area. Both populations occur outside of the project area (CDFG, 2008).

### New Delta Intake and Pump Station

A rose-mallow population consisting of fewer than 15 plants occurs at the site for the new Delta Intake and Pump Station. Other local populations are greater than 1,000 feet from new facilities and are outside the project area.

### Delta-Transfer Pipeline

The Delta-Transfer Pipeline alignment primarily traverses lands that are developed or used for agriculture. Suitable habitat for special-status plant species was not identified in the study area; therefore, no impacts are expected (ESA, 2007).

### Expanded Transfer Facility

Reconnaissance-level botanical surveys conducted at the Expanded Transfer Facility in 2007 showed the study area to be highly disturbed. Due to prior soil manipulation and high densities of non-native herbaceous plants, the site does not support special-status plant species and no impacts are anticipated (ESA, 2007).

### Transfer-LV Pipeline

The majority of the Transfer-LV Pipeline alignment is within the watershed, and focused plant surveys indicate that no special-status plant species would be affected by pipeline construction. The segment from the watershed boundary to the Expanded Transfer Facility crosses a livestock pasture, a segment of Kellogg Creek, and maintained annual grassland. No suitable habitat for special-status plant species is available in the study area; therefore, no impacts are expected (ESA, 2007).

### Transfer-Bethany Pipeline

Focused botanical surveys (ESA, 2008b) and database searches (CDFG, 2008) identified several San Joaquin spearscale populations in the alignment near Armstrong Road (Figure 4.6-13). Limited follow-up surveys would be required for both spearscale and brittlescale at a few distinct locations.

### Power Supply Infrastructure

**Power Option 1: Western Only.** Based on focused botanical surveys in spring 2008, power poles are not expected to impact special-status plant populations (ESA, 2008b). San Joaquin spearscale populations identified in the Western powerline alignment would be avoided by siting the Western substation and power poles away from the spearscale populations. Limited follow-up surveys would be required to document the distribution of heartscale and brittlescale, though the likelihood of encountering these species in the alignment is considered low.

**Power Option 2: Western and PG&E.** San Joaquin spearscale populations identified in the Western powerline alignment would be avoided by siting the power poles away from the spearscale populations. Limited follow-up surveys would be required to document the distribution of heartscale and brittlescale, though the likelihood of encountering these species in the alignment is considered low.

Special-status plant populations were not identified in the PG&E study area (ESA, 2008b). Therefore, impacts are not anticipated from the PG&E substation and distribution line from the PG&E substation to the Transfer Facility.

#### Summary of Alternative 1

Under Alternative 1, the project would directly impact special-status plant populations including Brewer's dwarf-flax, rose-mallow, and San Joaquin spearscale. An unknown number of individual Brewer's dwarf-flax plants would be affected by inundation and relocation of the westside access road, a small population of rose-mallow would be affected at the new Delta Intake and Pump Station site, and a population of San Joaquin spearscale would be affected by the Transfer-Bethany Pipeline alignment. Limited follow-up surveys would be needed to assess the presence of heartscale and brittlescale populations that may be present in several distinct locations on the Transfer-Bethany Pipeline and on the Western powerline alignment.

Impacts related to Alternative 1 would be significant prior to mitigation, but can mitigated to a less-than-significant level through avoidance, protection, restoration, and habitat enhancement. Impacts associated with Alternative 1 would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.3a, which strives to minimize impacts through avoidance strategies and protective measures; and Mitigation Measure 4.6.3b, which provides compensation for impacts through restoration and habitat enhancement.

### *Alternative 2*

Alternative 2 would have identical impacts to special status plant populations as Alternative 1. This is considered a significant impact prior to mitigation. Impacts associated with Alternative 2 would be reduced to a less-than-significant level through implementation of Mitigation Measures 4.6.3a and 4.6.3b.

### *Alternative 3*

Potential impacts to special-status plant species under Alternative 3 would be somewhat less than those described for Alternative 1. Without the Transfer-Bethany Pipeline, impacts to special-status plants would be limited to Brewer's dwarf-flax within the watershed (as described for Alternative 1). Expansion of the Old River Intake and Pump Station proposed under this alternative only would not involve any physical site modification or disturbance either on the land or in the water. Therefore, expansion of this facility would not affect local rose-mallow populations.

Limited follow-up surveys would be needed to assess the presence of heartscale and brittlescale populations that may be present in several distinct locations on the Western powerline alignment.

Impacts to these species would be a significant impact prior to mitigation. Impacts associated with Alternative 3 would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.3a and 4.6.3b.

### *Alternative 4*

No special-status plant populations are known within the 160-TAF inundation zone and no populations would be affected in the surrounding study area (ESA, 2007) (Figure 4.6-13). The 160-TAF borrow area does not support special status plants. Impacts to special status plant populations would not occur under Alternative 4.

#### Mitigation Measures

Mitigation Measures 4.6.3a and 4.6.3b include focused plant surveys coupled with avoidance and minimization of impacts; harvesting, transplanting, and long-term maintenance of affected individuals; and the establishment of permanent mitigation sites that provide the specific habitat needs for each affected species. Implementation of these mitigation measures would reduce the impacts on special-status plant species to a less-than-significant level.

**Measure 4.6.3a:** Where necessary (see Figures 4.6-12 and 13), CCWD shall complete focused plant surveys on out-of-watershed pipeline alignments and facilities following CDFG and USFWS special-status plant survey guidelines. Comprehensive special-status plant surveys have been completed, except at a few sites on the Transfer-Bethany Pipeline alignment, within the Western substation siting zone (Power Option 1), and within the Western powerline alignment associated with Power Option 2 (i.e., within the siting zone for the new Western substation described above) and 2) and north of the Skinner Delta Fish Protective Facility (Power Option 2). Surveys shall document the location, extent, and size of *Atriplex* (brittlescale and heartscale) populations, if present, and shall be used to inform the planned avoidance of rare plant populations whenever possible. The Western substation shall be sited within the Western substation study area so as to avoid and minimize impacts to San Joaquin spearscale.

To the extent feasible, the final project design shall minimize impacts on known special-status plant populations within and next to the construction footprints. CCWD and its contractors will design facilities to avoid sensitive plant populations whenever feasible, and shall install exclusion fencing and/or silt fencing around sensitive plant populations with as large a buffer as possible to minimize the potential for direct and indirect impacts such as fugitive dust and accidental intrusion into sensitive areas. Dust and erosion control measures are described in **Measure 4.5.1**.

**Measure 4.6.3b:** Where avoidance is not feasible, CCWD shall compensate for the loss of special-status plants through the following steps:

- A qualified ecologist shall develop and implement a restoration and mitigation plan according to CDFG guidelines and in coordination with CDFG and USFWS. At a minimum, the plan shall include collection of reproductive structures from affected plants, a full description of microhabitat conditions necessary for each affected species, seed germination requirements, restoration techniques for temporarily disturbed occurrences, assessments of potential transplant and enhancement sites, success and performance criteria, and monitoring programs, as well as measures to ensure long-term sustainability. The mitigation plan shall apply to portions of the Los Vaqueros Watershed, portions of Transfer-Bethany Pipeline that require vernal pool restoration (i.e., near Byron Airport), and areas that support rose-mallow on the banks of Old River.

- Land that supports known populations of affected special-status plants shall be identified, enhanced, and protected within the watershed or acquired outside of the watershed at a ratio of 1.1:1 and protected in perpetuity with conservation easements.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.4: Project construction would result in impacts on California red-legged frog and California tiger salamander, including aquatic breeding habitat and upland aestivation habitat for these species. (Less than Significant with Mitigation)**

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

Project construction has the potential to directly affect the California red-legged frog and California tiger salamander, permanently alter or inundate aquatic breeding sites for these species, and inundate upland aestivation sites. Permanent impacts on aquatic sites and upland aestivation habitat would generally occur as a result of reservoir inundation, while temporary impacts on upland aestivation areas would occur along pipeline corridors that traverse undeveloped, annual grasslands.

Direct impacts on known and potential aquatic breeding sites include the loss of 11 ponds in the 275-TAF reservoir inundation area. Five ponds in the Inlet/Outlet Pipelines construction area, each of which supports California red-legged frog breeding, would be avoided by project design; however, these ponds are subject to long-term temporary (i.e., greater than 1 year) dewatering during construction, as Los Vaqueros Reservoir will be unavailable as a water source during this period. Ten of the 11 inundated ponds support California red-legged frog breeding populations and four ponds support California tiger salamander breeding (see Figures 4.6-7 and 4.6-8 and **Table 4.6-11**). Eighteen stock ponds are dependent upon the reservoir for supplemental water.

A GIS analysis of potential and known breeding sites and available annual grassland and oak woodland upland habitats that occur within an accessible distance to breeding ponds (e.g., within 1 kilometer [0.62 mile]) indicates that all undisturbed annual grasslands and oak woodland habitats in the watershed may support aestivating California tiger salamanders or California red-legged frogs, and provide upland movement corridors for these species. The expansion of the Vaqueros Reservoir and associated in-watershed facilities would cause the direct and permanent loss of 976.2 acres of annual grasslands and 149.6 acres of oak woodlands, representing a total of 1,125.8 acres of upland aestivation and migratory habitat potentially occupied by these species (see **Table 4.6-12**). In the Inlet/Outlet Pipelines construction area, construction activities would last for 2 years. The areas of temporary disturbance would ultimately be restored to annual grasslands or oak woodland after project construction. An unknown number of California red-legged frogs and California tiger salamanders would be destroyed as a result of these impacts to upland habitat and aquatic habitat sites.

**TABLE 4.6-11**
**IMPACTS ON CALIFORNIA TIGER SALAMANDER AND CALIFORNIA RED-LEGGED FROG AQUATIC HABITAT**

| Pond Name | Description | California Tiger Salamander | California Red-Legged Frog |
|---|---|---|---|
| N1W (To be avoided and dewatered) | Constructed alkali marsh pond with a supplemental water source; semipermanent water | Not identified | Breeding |
| N2W (To be avoided and dewatered) | Constructed alkali marsh pond with a supplemental water source; semipermanent water | Not identified | Breeding |
| N3W (To be avoided and dewatered) | Constructed alkali marsh pond with a supplemental water source; semipermanent water | Not identified | Breeding |
| N4W (To be avoided and dewatered) | Constructed alkali marsh pond with a supplemental water source; semipermanent water | Not identified | Breeding |
| N5W (To be avoided and dewatered) | Constructed alkali marsh pond with a supplemental water source; semipermanent water | Not identified | Breeding |
| K6W* | Constructed semipermanent marsh pond. No supplemental water provided | Not identified | Breeding |
| K7W* | Constructed semipermanent marsh pond. No supplemental water provided | Not identified | Breeding |
| K8W* | Constructed semipermanent marsh pond. No supplemental water provided | Not identified | Breeding |
| K9W* | Constructed semipermanent marsh pond. No supplemental water provided | Breeding | Present, breeding not known |
| D7* | Nonmitigation stock pond; permanent water. No supplemental water provide | Not identified | Breeding |
| D11* | Nonmitigation stock pond; permanent water. No supplemental water provided | Breeding | Breeding |
| F1 | Constructed semipermanent marsh pond; water retention issues (2005) | Not identified | Not observed (2005) |
| F2 | Nonmitigation stock pond; permanent water. No supplemental water provided | Not identified | Breeding |
| F4 | Nonmitigation stock pond; permanent water. No supplemental water provided | Not identified | Breeding |
| F8* | Nonmitigation stock pond; permanent water. No supplemental water provided | Breeding | Breeding |
| F11W | Constructed semipermanent marsh pond. No supplemental water provided | Breeding | Breeding |

Note: an asterisk (*) indicates the ponds that would be impacted under Alternative 4, and includes 7 of the 16 features. All 16 sites would be impacted under Alternatives 1, 2, or 3.

**TABLE 4.6-12**
**IMPACTS ON CALIFORNIA TIGER SALAMANDER AND CALIFORNIA RED-LEGGED FROG UPLAND AESTIVATION HABITAT (ACRES)**

| | Grasslands | | Oak Woodland | Other Habitats[1] | |
|---|---|---|---|---|---|
| **Project Component** | **Permanent Impact** | **Temporary Impact** | **Permanent Impact - Oak Woodland** | **Permanent Impact** | **Temporary Impact** |
| Alternatives 1 and 2 | | | | | |
| In-watershed Facilities[2] | 976.2 | 45,8 | 149.5 | 12.3 | 0 |
| Delta-Transfer Pipeline | 0 | 24.2 | 0 | 0 | 0 |
| Transfer-LV Pipeline | 0 | 76.5 | 0.1 | 0 | 0.7 |
| Transfer-Bethany Pipeline | 0 | 150.9 | 0 | 0 | 23.5 |
| Expanded Transfer Facility | (1.2)[3] | 0 | 0 | 0 | 0 |
| **Total - Alternatives 1 and 2** | 976.2 | 297.4 | 149.6 | 12.3 | 24.4 |
| Alternative 3 | | | | | |
| In-watershed Facilities | 976.2 | 45.8 | 149.5 | 12.3 | 0 |
| Delta-Transfer Pipeline | 0 | 24.2 | 0 | 0 | 0 |
| Transfer-LV Pipeline | 0 | 76.5 | 0.1 | 0 | 0.7 |
| **Total – Alternative 3** | 976.2 | 146.5 | 149.6 | 12.3 | 0.7 |
| Alternative 4 | | | | | |
| In-watershed Facilities | 498.5 | 19.2 | 22.1 | 12.2 | 0 |
| **Total – Alternative 4** | 498.5 | 19.2 | 22.1 | 12.2 | 0.0 |

1 Other habitats include lacustrine, natural seasonal wetland, saline emergent/nontidal freshwater, upland cropland, upland scrub, urban/disturbed, and valley/foothill riparian
2 In-watershed facilities includes the PG&E substation. Habitat for California tiger salamander and California red-legged frog does not occur at the Western substation site.
3 Habitat at the Expanded Transfer Facility is considered low quality aestivation habitat for the California tiger salamander and California red-legged frog and is not included in the total below.

Water would be bypassed around Los Vaqueros Dam during construction so that water releases into lower Kellogg Creek would be maintained during construction. Water would also continue to enter the lower reach of the creek seasonally from other natural sources tributary to the creek (e.g., spring releases, surface runoff, and groundwater). With maintained flows, the quality and availability of breeding and nonbreeding (summer) habitat for California red-legged frogs is not expected to change markedly in Kellogg Creek.

### New Delta Intake and Pump Station

Habitat for California red-legged frog and California tiger salamander does not occur near the new Delta Intake and Pump Station, therefore no impacts are anticipated at this location.

### Delta-Transfer Pipeline

The Delta-Transfer Pipeline alignment traverses 24.2 acres of potentially occupied California red-legged frog and California tiger salamander aestivation habitat that occur over a linear distance of 1.2 miles (see Table 4.6-12). A 200-foot-wide construction corridor would result in a direct, temporary impact on 24.2 acres of potentially occupied upland habitat. One potential aquatic breeding

site occurs about 0.25 mile north of the pipeline alignment, but would not be directly or indirectly affected by construction.

### Transfer-LV Pipeline

Along the Transfer-LV Pipeline alignment, 76.5 acres of potentially occupied aestivation habitat (ranging over 4.3 linear miles) could be temporarily affected (see Table 4.6-12). A 200-foot-wide construction corridor would have a direct, temporary impact on 76.5 acres of potentially occupied upland habitat. At least two aquatic sites are within 0.25 mile of the pipeline alignment that support breeding California red-legged frogs, and five California tiger salamander breeding ponds downstream from Los Vaqueros Dam could be affected by the pipeline construction. Additionally, the alignment crosses Kellogg Creek at three locations that could support red-legged frogs (nonbreeding habitat), and the creek corridor could be subject to major disturbances in the Inlet/Outlet Pipelines construction area. All pipeline impacts upon aestivation habitat would be temporary. California tiger salamanders are not known or expected to breed in Kellogg Creek.

### Transfer-Bethany Pipeline

Along the Transfer-Bethany Pipeline alignment, 7.7 miles of potentially occupied California red-legged frog and California tiger salamander aestivation habitat could be temporarily affected (see Table 4.6-12). A 300-foot-wide construction corridor would result in a direct, temporary impact on 150.9 acres of potentially occupied upland habitat. At least two aquatic sites are within 0.25 mile of the pipeline alignment that could be affected by construction. The pipeline alignment crosses Brushy Creek along Armstrong Road and would temporarily affect aquatic habitat in the creek at that location. All pipeline impacts upon aestivation habitat would be temporary.

### Power Supply Infrastructure

**Power Option 1: Western Only**. California tiger salamander and California red-legged frog do not occur within the Option 1 study area; thus, no impacts are anticipated from proposed facilities.

**Power Option 2: Western and PG&E.** California tiger salamanders and California red-legged frogs do not occur within the Option 2 study area for power facilities from Western; thus, no impacts are anticipated from proposed facilities.

The PG&E substation is proposed in an area that may provide suitable aestivation for California tiger salamanders, with potential breeding sites near Kellogg Creek, less than 0.5 mile west of proposed facilities. Therefore, the likelihood exists that migrating or aestivating adult salamanders or California red-legged frogs could be harmed during construction. This impact is treated as part of the in-watershed facilities impact acreage in Table 4.6-12.

### Expanded Transfer Facility

Construction of the Expanded Transfer Facility could affect 1.2 acres of potentially occupied upland habitat for California tiger salamander. California red-legged frogs are expected to use this area only intermittently due to the lack of site cover, primarily to disperse between aquatic sites. Because this potential habitat is of low quality, it is not included in the acreage totals in Table 4.6-12.

### Summary for Alternative 1

Under Alternative 1, the project would directly impact California red-legged frog and California tiger salamander individuals, aquatic breeding habitat, and upland aestivation habitat through inundation, reduction in supplemental water supplied from the reservoir to ponds, sustained dewatering of some ponds, and other construction activities. Upland aestivation and migratory habitat in the form of grasslands would see the greatest impact by area. In all cases, impacts related to Alternative 1 would be significant prior to mitigation, but can be mitigated to a less-than-significant level through avoidance and impact-minimization measures, through the incorporation of onsite and offsite compensatory mitigation, and through provision of supplemental water to pond breeding sites during construction. Under Alternative 1, flows would be maintained in lower Kellogg Creek using a bypass around Los Vaqueros Dam. Impacts associated with Alternative 1 would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.4a, which serves to avoid and minimize species take, and Mitigation Measure 4.6.4b, which provides compensation for impacts through land acquisition and habitat management.

## *Alternative 2*

Project impacts to California red-legged frog, California tiger salamander and habitat for these species due to project implementation under Alternative 2 would be the same as those discussed for Alternative 1 (Table 4.6-12). This is considered a significant impact prior to mitigation. Impacts associated with Alternative 2 would be reduced to a less-than-significant level through implementation of Mitigation Measures 4.6.4a and 4.6.4b.

## *Alternative 3*

In the absence of the Transfer-Bethany pipeline, impacts to California red-legged frogs and California tiger salamanders and their habitat would be about 173 acres less than under Alternative 1 (Table 4.6-12). These species do not occur near the Expanded Old River Intake and Pump Station, thus impacts would not occur at this location. This impact is significant prior to mitigation. Implementation of Mitigation Measures 4.6.4a and 4.6.4b would reduce these potential impacts to a less-than-significant level.

## *Alternative 4*

Under Alternative 4, project construction has the potential to directly affect California red-legged frogs and California tiger salamanders, permanently inundate aquatic breeding sites for these species, and inundate upland aestivation sites within the currently described migratory capabilities of each species. Permanent impacts on aquatic sites and upland aestivation habitat would be restricted to the area of reservoir inundation and borrow sites.

Direct impacts on known and potential aquatic breeding sites include the loss of seven ponds in the 160-TAF reservoir inundation area. As discussed for Alternative 1, five ponds below Los Vaqueros Dam could be subject to temporary dewatering during construction. Seven of the above ponds support California red-legged frog breeding populations and three support California tiger salamander breeding (see Figures 4.6-7 and 4.6-8 and Table 4.6-12).

The expansion of the Los Vaqueros Reservoir to 160 TAF and associated in-watershed facilities would cause the direct and permanent loss of 498.5 acres of annual grasslands and 22.1 acres of oak woodlands, a total of 520.6 acres of upland aestivation habitat potentially used by these species (see Table 4.6-12). Temporary disturbances to upland habitat would occur in the 160-TAF borrow area. Because the exact location of alluvial deposits within the borrow area is unknown, a borrow area zone was analyzed for impact analysis purposes (see Figure 3-18). As shown on the figure, in the general area proposed for borrow materials, restricted areas where no borrow activities would occur have been identified and would avoid impacts to California red-legged frog and California tiger salamander aquatic breeding habitat. The areas of temporary disturbance would ultimately be restored to annual grasslands after construction. An unknown number of California red-legged frogs and California tiger salamanders would be destroyed as a result of impacts to upland habitat and aquatic habitat sites.

This impact remains significant prior to mitigation. Implementation of Mitigation Measures 4.6.4a and 4.6.4b would reduce these potential impacts to a less-than-significant level.

### Mitigation Measures

The implementation of Measure 4.6.4a, which includes measures to avoid and minimize take of individual frogs and salamanders, and Measure 4.6.4b, which provides for habitat compensation and enhancement, would reduce the impacts on California red-legged frogs and California tiger salamanders to a less-than-significant level.

> **Measure 4.6.4a:** CCWD shall implement measures to minimize and avoid take of California red-legged frogs and California tiger salamanders. Before and during construction, the following actions shall minimize impacts on these species:
>
> - CCWD shall submit the name and credentials of a biologist qualified to act as construction monitor to USFWS for approval at least 15 days before construction work begins. General minimum qualifications are a 4-year degree in biological sciences or other appropriate training and/or experience in surveying, identifying, and handling California tiger salamanders and California red-legged frogs.
>
> - A USFWS-approved biologist shall survey the work sites 2 weeks before the onset of construction. If California tiger salamanders or California red-legged frogs (or their tadpoles or eggs) are found, the approved biologist shall contact USFWS to determine whether moving any of these life-stages is appropriate. If USFWS approves moving the animals, the approved biologist shall be allowed sufficient time to move frogs and/or salamanders from the work sites before work begins. If these species are not identified, construction can proceed at these sites. The approved biologist shall use professional judgment to determine whether (and if so, when) the California tiger salamanders and/or California red-legged frogs are to be moved. The USFWS-approved biologist shall immediately inform the construction manager that work should be halted, if necessary, to avert avoidable take of listed species.
>
> - Areas will be monitored during construction to identify, capture, and relocate sensitive amphibians, if present.

- A detailed California red-legged frog/California tiger salamander relocation plan will be prepared at least 3 weeks before the start of groundbreaking, and submitted to USFWS for review. The purpose of the plan is to standardize amphibian relocation methods and relocation sites.

- A USFWS-approved biologist shall be present at the active work sites until California red-legged frogs and California tiger salamanders have been removed, and habitat disturbance has been completed. Thereafter, the contractor or CCWD shall designate a person to monitor onsite compliance with all minimization measures. A USFWS-approved biologist shall ensure that this individual receives training consistent with USFWS requirements.

- CCWD and its contractors shall initiate all work within potential California red-legged frog aquatic breeding habitat between May 1 and November 1 (i.e., generally identified as the nonbreeding season). Project construction timing constraints are summarized in Section 4.6.3.

- CCWD and its contractors shall install frog-exclusion fencing (i.e., silt fences) around all construction areas that are within 100 feet of potential California red-legged frog or California tiger salamander aquatic breeding habitat.

- A USFWS-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and California tiger salamander and their habitat, the importance of these species and their habitat, the general measures that are being implemented to conserve the red-legged frog and tiger salamander as they relate to the project, and the boundaries within which the project construction shall occur.

- During work activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. After construction, the contractor shall remove all trash and construction debris from work areas on a daily basis.

- All fueling and maintenance of vehicles and other equipment and staging areas will occur at least 20 meters (65.6 feet) from any riparian habitat or water body.

- Before the onset of work, CCWD shall prepare a stormwater pollution prevention plan and water pollution control plan as described in Measures 4.5.1a and 4.5.1b to allow prompt and effective response to any accidental spills.

- Before construction begins, CCWD shall prepare a plan describing pre-project conditions, restoration, and monitoring success criteria. CCWD or its contractors shall restore the contours and revegetate all areas disturbed by the project with an appropriate assemblage of native vegetation suitable to the area.

- Where needed to maintain California red-legged frog and/or California tiger salamander breeding in existing mitigation wetlands that are presently supplemented with water, but are not directly disrupted by construction, CCWD shall continue to provide supplemental water to these ponds during and after construction according to the existing terms and conditions for these mitigation sites.

**Measure 4.6.4b:** CCWD shall provide compensation for permanent and temporary impacts on California tiger salamander and California red-legged frog aquatic habitat. In accordance with MSCS (CALFED, 2000) objectives, CCWD shall provide compensation for the permanent loss of California red-legged frog and California tiger salamander aquatic habitat at a minimum of a 3:1 ratio. The MSCS does not require compensation for loss of California red-legged frog and California tiger salamander aestivation habitat. To satisfy compensation guidelines, CCWD shall implement the following measures:

- CCWD shall mitigate for the loss of aquatic breeding sites that will be filled or otherwise directly affected by the project (estimated to be 16 sites at this time; number to be confirmed by pre-construction surveys) as well as mitigate for impacts on associated California red-legged frog upland habitat by providing compensatory habitat.

- CCWD shall develop and implement a mitigation, monitoring, and management plan, with input from regulatory agencies that shall outline long-term management strategies and performance standards to be attained to compensate for habitat losses resulting from the project. At a minimum, the plan shall include standards for mitigation site selection and construction specifications for mitigation sites, a description of site conditions including aerial maps, an analysis of local amphibian habitat (e.g., is another breeding habitat nearby?), and performance criteria by which site quality can be assessed over time (see below). A monitoring program shall be established to track the development of habitat conditions that are conducive to the establishment of the California red-legged frog and/or California tiger salamander breeding populations. Long-term monitoring (e.g., night surveys and aquatic dipnet surveys) shall be performed on an annual basis to determine if these species are present. The plan shall provide that monitoring be performed to ensure that mitigation ponds that are dependent upon artificial water function as designed.

- Performance criteria shall be used to assess the success of aquatic habitat created for California red-legged frogs and California tiger salamander aquatic habitat. These criteria shall be outlined in the mitigation, monitoring and management plan and shall include:

    - A description of the type of habitat to be created (e.g., permanent marsh consisting of open water and emergent vegetation; semipermanent marsh);

    - The total area, size and number of California red-legged frog and California tiger salamander mitigation ponds to be created based on a comparable loss of breeding sites (e.g., 1:1 replacement ratio) as a result of the project. These ponds shall concurrently satisfy wetland mitigation requirements identified in Measure 4.6.2b;[6]

    - Constructed permanent marsh ponds that are designed to support California red-legged frog breeding shall provide:

        - at least 75% absolute vegetation cover of wetland plant species within shallow water emergent vegetation zones;

[6] Note that final mitigation acreage requirements and compensation ratios may be adjusted by the USFWS or USACE based on actual wetland impacts, which will be identified during the permitting process.

        - year-round inundation with depths of at least 1.5 feet in the vegetation zone and 4 feet in open water.

    - Constructed semipermanent marsh ponds that are designed to support California tiger salamander or California red-legged frog breeding habitat shall provide:

        - water regimes similar to affected features, with semi-permanent water ranging from depths of 1.5 to 2.5 feet or greater during a typical rainfall year and an inundation period that exceeds 120 consecutive days;

        - a predominance of seasonal wetland plants (at least 75% absolute vegetation cover) during the winter/spring monitoring period (though may support upland species later in the year when pools dry).

- To the greatest practicable extent, CCWD or its contractors shall construct and manage compensation habitat (i.e., replacement ponds) for California red-legged frogs and California tiger salamanders prior to project implementation. A qualified biologist shall ensure that ponds are functioning before the removal and/or inundation of existing California tiger salamander and California red-legged frog aquatic breeding sites.

- Construction within the Kellogg Creek corridor (i.e., creek crossing sites) shall be designed to impact the smallest area required to provide for the installation of pipelines, particularly in the area below Los Vaqueros Dam.

- CCWD and its contractors shall restore and enhance Kellogg Creek and adjacent natural upland environs in the project area (about 4.0 linear miles) to restore suitable aquatic breeding habitat for California red-legged frogs and restore disturbed upland areas as close as possible to pre-project conditions. Methods of enhancement and restoration could include, but are not limited to, reducing erosion; installing breeding ponds; excluding cattle from sensitive areas; and managing, salvaging, and seeding with grasses, forbs, and other species that are native to the site, as well as other measures to increase water quality within the enhancement and restoration reach.

New mitigation ponds that are created for California red-legged frog and California tiger salamander shall be hydrologically self-sustaining and shall not require a supplemental water supply. Because few natural drainages in the Los Vaqueros Watershed could maintain self-sustaining mitigation ponds, a portion of the pond mitigation locations will likely be identified outside of the watershed.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.5: Project construction would result in direct and indirect impacts on existing populations of and habitat for the western pond turtle. (Less than Significant with Mitigation)**

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

Construction of the Expanded Los Vaqueros Reservoir, in-watershed facilities, and recreational facilities would directly affect known western pond turtle populations as well as both aquatic and upland habitat for the western pond turtle. Six stock ponds, ten created wetlands, and several drainages (including Kellogg Creek) would be affected by reservoir inundation and in-watershed activities; of these areas, at least three ponds known to support western pond turtles would be directly affected by inundation. Eight ponds that support western pond turtles would be directly affected by construction of Los Vaqueros Dam, associated Inlet/Outlet Pipelines, and relocation of the westside access road.

Western pond turtles are documented in the Inlet/Outlet Pipelines construction area, and this species may opportunistically be encountered in ponds, within Kellogg Creek, or in uplands in this area. Where possible, siting of the pipeline and construction activity would avoid aquatic features that could support this species. Turtles would be relocated if encountered in work areas, and turtle populations would be monitored to ensure successful relocation. Due to topographic constraints, such as steep slopes and narrowing canyons that arise at higher elevations in the watershed, it might not be feasible to replace all the directly affected wetland features near the point of impact, or even in nearby portions of the watershed. Thus, adult western pond turtles might need to be relocated to nearby offsite mitigation sites. While it could be possible to identify and relocate individual turtles, nest sites can be difficult to find because they are often away from aquatic areas and do not stand out from adjacent habitat. Nesting generally extends from late April through August, depending on the latitude, with a peak from late May to early July (Lovich, undated). It is anticipated that reservoir inundation at any time of the year could cause the direct loss of an unknown number of active nests.

Direct long-term temporary (i.e., greater-than-1-year) impacts would include disturbance of potential western pond turtle habitat in the construction zone along Kellogg Creek associated with dam and Inlet/Outlet Pipelines construction. Outside the construction zone, flows to Kellogg Creek would be maintained with a bypass running from water sources in the upper creek as part of Alternative 1. Downstream from Los Vaqueros Dam, the creek would still receive water from other contributing portions of the watershed and some ponding would be maintained in this creek.

### New Delta Intake and Pump Station

Western pond turtles are not known to occur in the new Delta Intake and Pump Station project study area, but turtle basking habitat, including rocks and floating logs and boards, are present in the project area on the banks of Old River. Potential nesting habitat is available in friable soils between Old River levee and adjacent agricultural lands. This area is within the described range of this species, thus, it is possible that pond turtles or turtle nests could be destroyed during

construction of the new intake structure, during dewatering activities in Old River, or when turtles are encountered by equipment in uplands areas.

### Delta-Transfer Pipeline

Impacts resulting from construction of the Delta-Transfer Pipeline generally would include upland disturbances within the 200-foot-wide construction corridor. Impacts would not be permanent, and disturbed habitat would be restored with native vegetation or returned to agricultural uses. Western pond turtles are not known to occur within 500 feet of the pipeline alignment, and aquatic sites that would support this species are generally limited in and near the construction corridor. Wetlands would be avoided where possible and restored where avoidance is not feasible. Therefore, direct impacts on western pond turtles or their associated habitat are not expected.

### Expanded Transfer Facility

Western pond turtles are not reported near the Expanded Transfer Facility study area, and no aquatic habitat in the near-project area would support this species. Therefore, no direct or indirect impacts on western pond turtles are expected.

### Transfer-LV Pipeline

Three western pond turtle occurrences are reported near the Transfer-LV Pipeline alignment (CDFG, 2008). These occurrences include areas along lower Kellogg Creek, where several stock ponds and created wetlands support this species. All aquatic features, including Kellogg Creek, stock ponds, and adjacent upland habitat, provide suitable habitat for western pond turtles. This species is expected at aquatic sites and may occur sporadically in upland areas.

### Transfer-Bethany Pipeline

Impacts resulting from construction of the Transfer-Bethany Pipeline would include disturbance of habitat within the 300-foot-wide construction corridor. Western pond turtles could be destroyed within construction corridors during their ordinary upland movement activities. Habitat impacts would be temporary because disturbed upland habitat would be restored with native vegetation after pipeline construction is completed. Western pond turtles are not reported within 500 feet of the pipeline alignment. The likelihood is low that this species would be encountered in annual grasslands during construction.

### Power Supply Infrastructure

**Power Option 1: Western Only.** Western pond turtles are documented from aquatic habitat in Italian Slough, and may be present in irrigation canals that traverse the Western powerline study area or adjacent upland habitat. This species may be encountered at any location on the Western powerline alignment. Impacts would be limited to disturbance and potential encounters during construction, with no permanent habitat impacts.

**Power Option 2: Western and PG&E.** Western pond turtles may be present in irrigation canals that traverse the Option 2 Western powerline study area or adjacent upland habitat. Impacts include potential encounters with adult turtles during construction, but no permanent habitat impacts.

Near the PG&E substation, western pond turtles are known from Kellogg Creek and may be infrequently encountered in upland areas and subject to vehicle mortality during construction.

#### Summary for Alternative 1

Under Alternative 1, the project would directly impact western pond turtle individuals and aquatic and upland nesting habitat through inundation, road relocation, and upland construction. Impacts related to Alternative 1 would be significant prior to mitigation but would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.5, which calls for surveys to identify individuals and nests in the construction area and relocate them.

### *Alternative 2*

Potential impacts to western pond turtles and their habitat would be the same as those discussed for Alternative 1. Impacts would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.5, which calls for surveys to identify individuals and nests in the construction area and relocate them.

### *Alternative 3*

Impacts to western pond turtles and their habitat at the reservoir and within the watershed would be the same as those described for Alternative 1. Outside the watershed, potential impacts would be lower under Alternative 3 than under Alternative 1 because this alternative would not include construction of either the new Delta Intake and Pump Station or the Transfer-Bethany Pipeline. Thus, this alternative would avoid any potential impact associated with these two facilities. Expansion of the Old River Intake and Pump Station proposed under this alternative only would not involve any physical site modification or disturbance either on the land or in the water. Therefore there would be no impact to western pond turtle at this site.

Impacts under this alternative would be considered significant direct effects of the project. The implementation of Mitigation Measure 4.6.5 would ensure that impacts to western pond turtles are minimized and reduce project effects to a less-than-significant level.

### *Alternative 4*

A 160-TAF reservoir expansion would inundate or destroy seven created wetlands and several drainages (including Kellogg Creek) that are known to support western pond turtle populations. The majority of these features, both upstream and downstream from the dam, would be available to turtles during construction, as would the lowered Los Vaqueros Reservoir.

Because the reservoir would not be fully drained under this alternative, turtles would likely stay within Los Vaqueros Reservoir and be less likely to wander into upland areas, including the Dam construction site, than under Alternative 1. This species could be disturbed or destroyed in upland habitat in the 160-TAF borrow area, which would not occur under Alternative 1; however, the overall construction footprint within the Los Vaqueros Watershed, and hence the likelihood of encountering moving turtles, would be lower under Alternative 4.

These would be considered significant direct effects of the project. The implementation of Mitigation Measure 4.6.5 would ensure that take is minimized and reduce project effects to a less-than-significant level.

### Mitigation Measures

The implementation of Mitigation Measure 4.6.5, which includes biological monitoring and turtle relocation, would reduce project impacts on western pond turtle populations and habitat to a less-than-significant level:

> **Measure 4.6.5:** Before construction activities begin, a qualified biologist[7] shall conduct western pond turtle surveys within creeks and in other ponded areas affected by the project. Upland areas shall also be examined for evidence of nests as well as individual turtles. The project biologist shall be responsible for the survey and for the relocation of turtles. Construction shall not proceed until a reasonable effort has been made to capture and relocate as many western pond turtles as possible to minimize take. However, some individuals may be undetected or enter sites after surveys, and would be subject to mortality. If a nest is observed, a biologist with the appropriate permits and prior approval from CDFG shall move eggs to a suitable location or facility for incubation, and release hatchlings into the creek system the following autumn. In addition, western pond turtles shall be included in the fish rescue operation described in Mitigation Measure 4.3.3 (Alternatives 1 and 2 only).
>
> **Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.6: Project construction under Alternatives 1, 2, and 3 would result in direct and indirect impacts on listed vernal pool fairy shrimp and their habitat, and on the non-listed midvalley fairy shrimp and curved-foot hygrotus diving beetle (Less than Significant with Mitigation)**

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

Vernal pool fairy shrimp are presumed present in all potentially suitable habitat in the project area. Vernal pool fairy shrimp are known from a single rock outcrop in the watershed known as the Kellogg Creek vernal pool complex. The outcrop is about 0.20 mile (1,056 feet) east and upslope from the proposed 275-TAF waterline. This location would not be directly affected by the reservoir inundation or proposed in-watershed facilities (Figure 4.6-5) (ESA, 2004). The USFWS (1995) Conference Opinion used as a BO for the existing Los Vaqueros Reservoir recognized the high sensitivity of the Kellogg Creek vernal pool complex. It required that public use of the

[7] The term "qualified biologist" refers to an individual who has at least a minimum education and qualifications that may include a 4-year degree in a biological sciences or other specific field and training and/or experience surveying, identifying, and handling the subject species. This individual differs from a "Service-approved biologist" in that the qualified biologist may only handle species that are not listed as threatened or endangered by the USFWS. The Service-approved biologist is authorized to relocate such species.

easternmost portion of the watershed be restricted, and that allowable activities at the complex include research and occasional educational activities to be conducted under the immediate supervision of CCWD staff or other responsible parties (USFWS, 1995).

The 1995 BO identified lands just east of the reservoir (i.e., shoreline areas) as suitable for low-intensity dispersed recreational use such as hiking and boat landing (USFWS, 1995). However, CCWD did not develop public access trails or open east-watershed lands to public access. This action negated the requirement to fence the Kellogg Creek vernal pool complex and provide patrols to ensure that no trespassing happens. The proposed eastside trail would provide public hiking access to shoreline areas. Trail construction and public access would not occur within 500 feet of the complex; therefore, direct impacts are not anticipated from trail construction or lawful use of trails. However, use of lands within 200 feet of the complex, which was the threshold established under the 1995 USFWS BO, provides the possibility for trespass and permanent damage to the Kellogg Creek vernal pool complex and vernal pool fairy shrimp populations.

Occupied vernal pool fairy shrimp habitat in the Los Vaqueros Watershed and the Kellogg Creek vernal pool complex would be avoided through planned trail routing, so direct impacts to vernal pool fairy shrimp populations would be avoided. The Kellogg Creek vernal pool complex could be subject to indirect disturbance as a result of recreational users on trails and in the vicinity accessing the area resulting in habitat degradation.

As previously stated, longhorn fairy shrimp and midvalley fairy shrimp are not expected to occur within the Los Vaqueros Watershed.

Suitable habitat for the curved-footed hygrotus diving beetle exists in six stock ponds and 10 created wetlands ponds, and this species is presumed present at these locations. Impacts would not occur to this diving beetle in Kellogg Creek or other flowing drainages. Any populations within the expanded reservoir footprint would be lost. Populations would remain unharmed in features that are drained but not physically altered.

### New Delta Intake and Pump Station

Two vernal pool fairy shrimp populations are reported 2 and 4 miles from the new Delta Intake and Pump Station. Longhorn fairy shrimp and midvalley fairy shrimp are not known near this project component. No seasonally ponding habitat lies in or near this study area; therefore, no direct or indirect impacts would occur to vernal pool branchiopods or their habitat at this facility.

Curved-foot hygrotus diving beetles are not described from this area, and are not subject to project impacts.

### Delta-Transfer Pipeline

Vernal pool fairy shrimp populations have been identified at distances of 1 to about 3 miles from the Delta-Transfer Pipeline alignment; longhorn fairy shrimp populations have been identified within 5 miles of the alignment. Potential habitat for vernal pool fairy shrimp and possibly midvalley fairy shrimp occurs in a single alkali swale within the project area. The 200-foot-wide pipeline

corridor would avoid any known occupied habitat but could affect potential habitat in the alkali swale. Therefore, direct or indirect impacts on potentially occupied vernal pool fairy shrimp and/or midvalley fairy shrimp habitat could occur as a result of Delta-Transfer Pipeline construction.

This alignment does not provide habitat for curved-foot hygrotus diving beetle, thus no impacts would occur to these species.

### Expanded Transfer Facility

The Expanded Transfer Facility construction would avoid any known or potential habitat for special-status branchiopods; therefore, no direct or indirect impacts are expected from this project element. This site does not provide habitat for curved-foot hygrotus diving beetles, thus no impacts would occur to this species.

### Transfer-LV Pipeline

Much of the Transfer-LV Pipeline alignment is within the watershed. Vernal pool fairy shrimp and longhorn fairy shrimp populations have been identified between 1 to 3 miles from the alignment. Suitable habitat is not present within the alignment or project study area. Therefore, no direct or indirect impacts on fairy shrimp populations or their habitat are expected from Transfer-LV Pipeline construction.

Potential curved-foot hygrotus diving beetle habitat near the pipeline alignment is described for *Los Vaqueros Reservoir Expansion, In-Watershed Facilities, and Recreational Facilities*, above, and includes five created wetland ponds downstream from the dam.

### Transfer-Bethany Pipeline

The Transfer-Bethany Pipeline alignment traverses identified vernal pool fairy shrimp habitat and crosses the western portion of critical habitat (Unit 19B) near Byron Airport for a linear distance of 4 miles (CDFG, 2008). The portion of designated critical habitat traversed by the alignment supports at least five topographic depressions that could support vernal pool fairy shrimp, and four additional pools that are occupied by this species (ESA, 2008a). Potential vernal pool fairy shrimp habitat was identified in an additional 7 pools on the alignment that are outside of designated critical habitat for this species. Vernal pool fairy shrimp is presumed present in all potentially suitable habitat for which CCWD chooses not to perform protocol level surveys. The non-listed midvalley fairy shrimp could co-occur with vernal pool fairy shrimp at any of these locations. Therefore, construction of the Transfer-Bethany Pipeline could cause direct and indirect impacts on potential and occupied vernal pool branchiopod habitat.

Habitat for curved-foot hygrotus diving beetles may be present in up to 16 alkali pools that were identified as vernal pool branchiopod habitat.

**Indirect Effects to Vernal Pool Hydrology.** Direct impacts on vernal pool fairy shrimp habitat are discussed above with direct and indirect impacts to seasonal wetlands and critical habitat addressed in Impact 4.6-2 and 4.6-13, respectively. For the portion of the Transfer-Bethany Pipeline alignment in the vicinity of Byron Airport, this Draft EIS/EIR analyzes potential project

effects on surface and subsurface hydrology of vernal pools that occur within and outside the area of direct project effects. As identified in the U.S. Fish and Wildlife Service Vernal Pool Recovery Plan, part of the pipeline alignment falls within one of the Altamont Hills core areas within the Livermore vernal pool region (USFWS, 2005a) (see Impact 4.6-13 for further discussion of effects to designated critical habitat). The purpose of the recovery plan is to incorporate ecosystem considerations through the development and implementation of recovery plans for communities or ecosystems where multiple listed species and species of concern occur, in a manner that restores, reconstructs, or rehabilitates the structure, distribution, connectivity, and function upon which those listed species depend (USFWS, 2005a).

The hydrologic analysis for this Draft EIS/EIR considered whether construction of the Transfer-Bethany Pipeline near Byron Airport could adversely affect local surface or groundwater hydrology, and therefore the functioning of larger vernal pool complexes in the Altamont Hills core area. The concern is whether the proposed buried pipeline and changes to surface topography after backfill would have the potential to impede the movement of water, either surface or groundwater, that supplies local vernal pools. The analysis of the changes to hydrology relied on a literature review of vernal pool hydrology, soil types, topography, and the local hydrology and geologic conditions.

The soil conditions in the area of the Transfer-Bethany Pipeline alignment include the Solano, San Ysidro, Linne, Rincon, and Altamont Series; these are fine-grained, clay-rich soils with slow to very slow permeability. Information obtained from an active groundwater remediation site located near Byron Hot Springs Road and near the proposed pipeline construction area indicate that depth to shallow groundwater (as reported since 1997) has ranged from 8.93 feet below ground surface (bgs) to 23.64 feet bgs. The water capacity, or the capacity of the soils to hold water, ranges from 3.5 to 10 inches of water per inch of soil. The slow permeability rates and water capacity, in conjunction with the relatively flat topography in this area, promote ponding and saturated, perched surface soils, especially after large rainfall events. These conditions result in the formation of vernal pools.

The soil conditions and topography at the site dictate the ability of surface and groundwater to be transmitted throughout this area and therefore determine the ideal conditions for vernal pool formation. Based on a generalized concept of vernal pool hydrology, geologic attributes of vernal pools include a surface soil underlain by a claypan[8], which severely restricts the downward rate of water movement, and surface drainage patterns conducive to pool formation (USFWS, 2005a). The soils underlying the site contain a claypan unit. The water-restricting horizon in the subsurface lithology contributes to the formation of a seasonal water table, or perched aquifer, and when the surface soils are fully saturated, vernal pool inundation begins (Hanes and Stromberg, 1998). Perched aquifer hydraulic gradients during and following precipitation events may play an important role in regulating the period of time during which the vernal pool area is inundated with water (Rains et al., 2006).

[8] A claypan is a dense, compact, low permeability layer in the subsoil having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary. Claypans are usually hard when dry, and plastic when wet and they limit or reduce the downward movement of water through the soil.

Given the known soil types, topography, and local geology, and the presence of a shallow groundwater aquifer, shallow groundwater is not considered a contributor to vernal pool functioning because the shallow groundwater is separated from the surface by the hard, plastic, clay-rich soil horizons, and shallow groundwater near the project area occurs at depths of approximately 9 to 24 feet bgs. Although shallow groundwater flow could be locally impeded in certain areas by the buried pipeline, it would not affect the supply of water to the downgradient vernal pools. The placement of the Transfer-Bethany Pipeline would have a less than significant impact to vernal pool hydrology because shallow groundwater is not considered a contributor to vernal pool inundation and functioning in this area.

However, the surface and perched aquifer hydrology within and downgradient at distances away from the pipeline corridor construction area could be adversely affected by the pipeline construction through alteration of surface topography, and changes in soil infiltration rates in surface soils. If surface topography were not adequately restored following construction, the pipeline could affect hydrology within the construction corridor and downgradient at distances away from the pipeline corridor if the surface flow drainage patterns currently supporting vernal pool formation are altered in such a way that future surface water runoff was routed away from the depressional features where vernal pools are formed. Similarly, changes in soil infiltration rates in surface soils within the approximate 97-acre footprint of the pipeline construction area could alter the perched aquifer hydrology by removing the low permeability claypan soil horizon supporting perched aquifer conditions if downgradient vernal pool areas are hydrologically connected through a continuous claypan soil horizon. It is assumed that the potential impact from changes to perched aquifer hydrology diminish with distance to the depressional features where vernal pools are formed.

Therefore, if the hardpan layer were not appropriately restored following construction, the installation of the Transfer-Bethany Pipeline through this area could have a permanent, direct impact on vernal pools within the pipeline construction corridor and could have indirect effects on downgradient pools through alteration of topography and/or changes to soil infiltration rates in surface soils. If surface topography and groundwater infiltration were not appropriately addressed, these could be potentially significant project effects. The implementation of Measures 4.6.2a and 4.6.2b (wetlands) and Measures 4.6.6a and 4.6.6b (vernal pool fairy shrimp) would reduce the potential for indirect impacts on these areas to a less-than-significant level**.**

### Power Supply Infrastructure

**Power Option 1: Western Only.** No direct or indirect impacts on vernal pool branchiopods or their habitat are anticipated at the Western substation site or powerlines. Curved-foot hygrotus diving beetles are not described from this area, and are not subject to project impacts.

**Power Option 2: Western and PG&E.** Aquatic habitat that may support fairy shrimp occurs in association with Natural Seasonal Wetlands just north of the Skinner Delta Fish Protective Facility (see Impact 4.6.1 and Figure 4.6-23). This area would be avoided by siting poles away from seasonal wetlands and restricting vehicle access in sensitive areas. Aquatic habitat that may support fairy shrimp was not identified near the proposed PG&E substation and PG&E

distribution line study areas. A handful of alkali pools north of the Skinner Delta Fish Protective Facility provide potential diving beetle habitat and would be spanned by powerlines.

#### Summary for Alternative 1

Vernal pool fairy shrimp and midvalley fairy shrimp are presumed present in all potentially suitable habitat in the project study area. Under Alternative 1, the project would directly and indirectly impact these species and their habitat during construction of the Delta-Transfer Pipeline, which could impact one potentially occupied pool, and the Transfer-Bethany Pipeline, which would impact 4 occupied pools and 12 potentially occupied pools. No direct impacts to vernal pool branchiopods would occur in the Los Vaqueros Watershed. Recreational use of the eastside trail and unintentional trespass to the Kellogg Creek vernal pool complex could degrade this sensitive vernal pool complex and cause a reduction in habitat quality at this site.

Construction of the Transfer-Bethany Pipeline in the Byron Airport/Armstrong Road area would directly affect vernal pools within the pipeline construction footprint; however, with surface restoration, the installation of the pipeline is not expected to indirectly affect local vernal pool hydrology in pools outside the alignment by altering surface flows, groundwater flow, or infiltration rates, or substantially reducing the quality or extent of the overall vernal pool complex outside the project alignment.

Impacts to curved-foot hygrotus diving beetles could occur in six stock ponds and ten created wetland ponds that would be lost, dewatered, or modified during construction or reservoir inundation. Impacts could also occur at the 16 alkali pools along the Transfer-Bethany Pipeline.

Impacts related to Alternative 1 are significant prior to mitigation, but can be mitigated to a less-than-significant level through implementation of Mitigation Measure 4.6.6a, which serves to avoid potential habitat and restrict post-project public access, and Mitigation Measure 4.6.6b, which provides for cyst salvage and the creation and restoration of vernal pools locally, or the acquisition of credits from local mitigation banks.

### *Alternative 2*

Potential impacts to vernal pool fairy shrimp, midvalley fairy shrimp, and curved-foot hygrotus diving beetles due to project implementation under Alternative 2 would be the same as those discussed for Alternative 1. This would be a potentially significant direct project impact prior to mitigation. Impacts would be reduced to a less-than-significant level through implementation of Mitigation Measures 4.6.6a and 4.6.6b.

### *Alternative 3*

Alternative 3 does not include the Transfer-Bethany Pipeline; therefore, impacts to vernal pool fairy shrimp, midvalley fairy shrimp, and curved-foot hygrotus diving beetles and their habitat would be reduced in comparison to Alternative 1. Impacts would be limited to potential fairy shrimp habitat described in the Alternative 1 for a single pool in the Delta-Transfer Pipeline alignment, and potential for trespass-related impacts in the Los Vaqueros Watershed. Habitat

for these species is not present in the area for the Expanded Old River Intake and Pump Station. These constitute a potentially significant direct project impact prior to mitigation. The application of Mitigation Measures 4.6.6a and 4.6.6b would reduce impacts to a less-than-significant level.

### *Alternative 4*

Occupied and potential vernal pool branchiopod habitat would be avoided under this alternative. Thus, no direct or indirect impacts would occur to branchiopod populations. Because the Delta-Transfer and Transfer-Bethany Pipelines are not part of Alternative 4, no impacts are anticipated to vernal pool fairy shrimp, midvalley fairy shrimp, and curved-foot hygrotus diving beetles under Alternative 4, and no mitigation would be required.

#### Mitigation Measures

The measures proposed below would mitigate impacts to both vernal pool fairy shrimp and midvalley fairy shrimp to a less-than-significant level. The implementation of Measure 4.6.4b, which provides compensation for temporary and permanent impacts to sensitive amphibian habitat in seasonal ponds, would reduce impacts to curved-foot hygrotus diving beetles to a less-than-significant level.

> **Measure 4.6.6a:** CCWD shall assume the presence of listed vernal pool branchiopods in all suitable habitat for which CCWD chooses not to perform protocol-level surveys. Preliminary branchiopod surveys (ESA, 2008a) have documented the general distribution of and habitat for vernal pool fairy shrimp in the project area. Longhorn fairy shrimp are not expected in the project areas based on this species' narrow habitat requirements, restricted range, and available habitat.
>
> CCWD shall minimize impacts on listed vernal pool branchiopods. To avoid and minimize direct and indirect impacts on listed vernal pool branchiopods, standard water quality protection measures shall be implemented as established in Mitigation Measure 4.5.1. Additional measures to minimize and avoid habitat for listed vernal pool branchiopods shall be implemented as required by USFWS and include:
>
> - Avoidance of potential habitat by narrowing work corridors near potential vernal pool branchiopod habitat to the greatest extent practicable.
>
> - Establishment of 250-foot buffers around potential branchiopod habitat, which is a typical avoidance distance that is recommended by the USFWS to minimize and avoid direct and indirect impacts.
>
> For the Kellogg Creek vernal pool complex the following protection measures shall be implemented:
>
> - Land uses in the easternmost portion of the Los Vaqueros Watershed shall remain restricted to activities associated with wind energy generation, dry-land farming, grazing, and administration by CCWD.
>
> - East of Los Vaqueros Reservoir, public access shall be restricted from CDFG conservation easement lands at the Kellogg Creek vernal pool complex and lands within

500 feet. Public access shall be restricted to research and occasional educational activities conducted under the supervision of CCWD staff or other designated land management agencies.

- The eastside trail and other public access trails located in proximity to the vernal pool complex shall be 500 feet or farther from the CDFG conservation easement and beyond direct line of sight to rock outcrop features.

- The eastern boundary of the public access area shall be fenced to prevent human access to the vernal pool complex and this fence and the Kellogg Creek vernal pools area shall be patrolled to ensure that no trespassing happens and that the fence remains intact.

- Before opening the eastside trail to public access, a biological evaluation shall be prepared by CCWD that establishes baseline environmental conditions at the vernal pool complex. Elements to be assessed include signs of trespass (e.g., trash, fires, site trampling, wear marks, rocks or other features in pools, or bicycle tire tracks), an evaluation of water quality during winter months to include at a minimum total dissolved solids, pH, and alkalinity, and documentation of any site damage. These conditions will be used as a basis for later site evaluations. An assessment of branchiopod populations shall also be provided as a component of the baseline evaluation.

- If excessive trespass, defined here as noticeable site deterioration relative to baseline conditions, is identified at the vernal pool complex CCWD shall immediately coordinate with USFWS. If site damage is identified, corrective remedies shall be implemented to prevent further harm to the complex. Such actions may include removing trash or debris from the complex, closing portions of the eastside trail to public access, enhancing site fencing, or other remedies to prevent trespass.

- While the eastside trail remains open to public access, annual reports shall be prepared to document site conditions relative to baseline conditions.

- Permanent signage shall be installed within 50 feet of the Kellogg Creek vernal pool complex (or on the surrounding fence) that specifies that, “This area is habitat of the vernal pool fairy shrimp, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment.”

- A USFWS-approved construction monitor shall be present during construction within 0.5 mile of the Kellogg Creek vernal pool complex, as identified in the 1995 BO (USFWS, 1995).

**Measure 4.6.6b:** CCWD shall mitigate for impacts to vernal pool fairy shrimp habitat through one or more of the following steps to provide compensatory habitat: (a) salvage of cysts and creation of replacement pool habitat in the local area at a replacement ratio of at least 3:1, (b) restoration of affected pools onsite after construction completion, or (c) acquisition of credits from a local mitigation bank(s).

To mitigate for the loss of aquatic sites on the Delta-Transfer Pipeline and Transfer-Bethany Pipeline alignments where vernal pool branchiopods are presumed present, CCWD shall implement the following measures:

- CCWD shall mitigate for the loss of branchiopod habitat that will be filled or otherwise directly affected by the project (estimated to be 17 pools) by providing compensatory habitat.

- For portions of the Transfer-Bethany Pipeline alignment near Byron Airport (e.g., adjacent to Wildlands' Byron Conservation Bank and Contra Costa County lands at Byron Airport) that support vernal pools, CCWD shall conduct a preconstruction land survey of the pipeline construction area to document current conditions of topography and existing drainage patterns, and to document shallow soil lithology within the construction area footprint as a baseline for restoring vernal pool hydrology following construction. In areas where claypan soils are encountered within critical habitat for vernal pool fairy shrimp (and Contra Costa goldfields) the upper clay soil layer shall be locally stockpiled and reestablished in place following pipeline installation. Upon completion of construction activities, final grading shall be completed to maintain surface flow conditions, local hydrology and similar compaction of surface soils to that of the documented current conditions prior to construction activities.

- CCWD shall develop and implement a mitigation, monitoring, and management plan, with input from regulatory agencies that shall outline long-term management strategies and performance standards to be attained to compensate for habitat losses resulting from the project. At a minimum, the plan shall include standards for mitigation site selection and construction specifications for mitigation sites, a description of site conditions including aerial maps, an analysis of local branchiopod habitat, and performance criteria by which site quality can be assessed over time (e.g., size, vegetation species present, date of initial ponding, ponding duration, and wildlife usage). A monitoring program will be established to track the development of habitat conditions that are conducive to the establishment of vernal pool branchiopods.

- To the greatest practicable extent, CCWD or its contractors shall construct compensation habitat (i.e., replacement pools) before habitat disturbances are incurred; or directly within the project footprint after construction. A qualified biologist shall ensure that ponds are functioning as designed.

- CCWD shall submit the name and credentials of a biologist qualified to act as construction monitor to USFWS for approval at least 15 days before construction work begins.

- With concurrence from the USFWS, a USFWS-approved biologist shall salvage soils from sites that are known to support vernal pool branchiopods at least 2 weeks before the onset of construction, or during the preceding dry season if pools are anticipated to hold water when construction begins. The salvaged soil samples will be stored and used to inoculate created pools once minimum performance standards are met at these locations.

- A USFWS-approved biologist shall be present at each active work site within 0.5 mile of potential fairy shrimp habitat until habitat disturbance has been completed. Thereafter, the contractor or CCWD shall designate a person to monitor onsite compliance with all minimization measures. A USFWS-approved biologist

shall ensure that this individual receives training consistent with USFWS requirements.

- A USFWS-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the vernal pool fairy shrimp and their habitat, the importance of these species and their habitat, the general measures that are being implemented to conserve fairy shrimp as they relate to the project, and the boundaries within which the project construction shall occur.

- All fueling and maintenance of vehicles and other equipment and staging areas will occur at least 100 feet from any fairy shrimp habitat.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.7: Project construction would have temporary and permanent impacts on potential San Joaquin kit fox habitat (Less-Than-Significant with Mitigation) and permanently reduce potential regional movement opportunities in one location for this species. (Significant and Unavoidable)**

### *Alternative 1*

Grassland habitat in eastern Contra Costa County represents suitable habitat for the San Joaquin kit fox. The loss, fragmentation, and degradation of habitat are considered primary threats to the northern population of San Joaquin kit fox (Orloff et al., 1986). Fragmentation of populations by aqueducts, busy highways, and other obstructions increases isolation, limits dispersal, and reduces genetic flow between populations. Other general threats to kit fox include the application of rodenticides in some areas, either as a direct threat through poisoning or as an indirect threat through reducing the abundance of their prey. Invasion of fragmented habitats by coyotes, red foxes (*Vulpes vulpes*), and feral dogs can also increase kit fox mortality (Ralls and White, 1995). USFWS, CDFG, and resource experts consider all continuous annual grasslands in the watershed and major portions of the proposed pipeline alignment routes as suitable habitat for the San Joaquin kit fox.

#### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

**Direct Impacts to Habitat.** Grassland habitats would be the primary vegetation community affected by inundation from reservoir expansion. Grasslands are the principal habitat used by San Joaquin kit foxes for denning, foraging, and dispersal, while open oak woodland and coastal scrub provide lower quality foraging habitat but are good for dispersal and cover from predators such as coyotes. CCWD has implemented an intensive schedule of annual kit fox surveys in the watershed since 1998. The only sighting during this period was in September 2008 in close proximity to the Los Vaqueros Watershed Administrative Offices (Howard, pers. comm.).

Reservoir expansion and in-watershed facilities would permanently impact 976.2 acres of annual grasslands habitat and 149.5 acres of oak woodland habitat; both of these habitats are thought to

provide kit fox denning, foraging, or dispersal habitat. These acreage figures include land both within and outside of dedicated CDFG kit fox conservation easements. Temporary in-watershed impacts from construction on kit fox habitat would affect up to 45.8 acres of annual grasslands habitat and 28.6 acres of valley foothill woodlands.

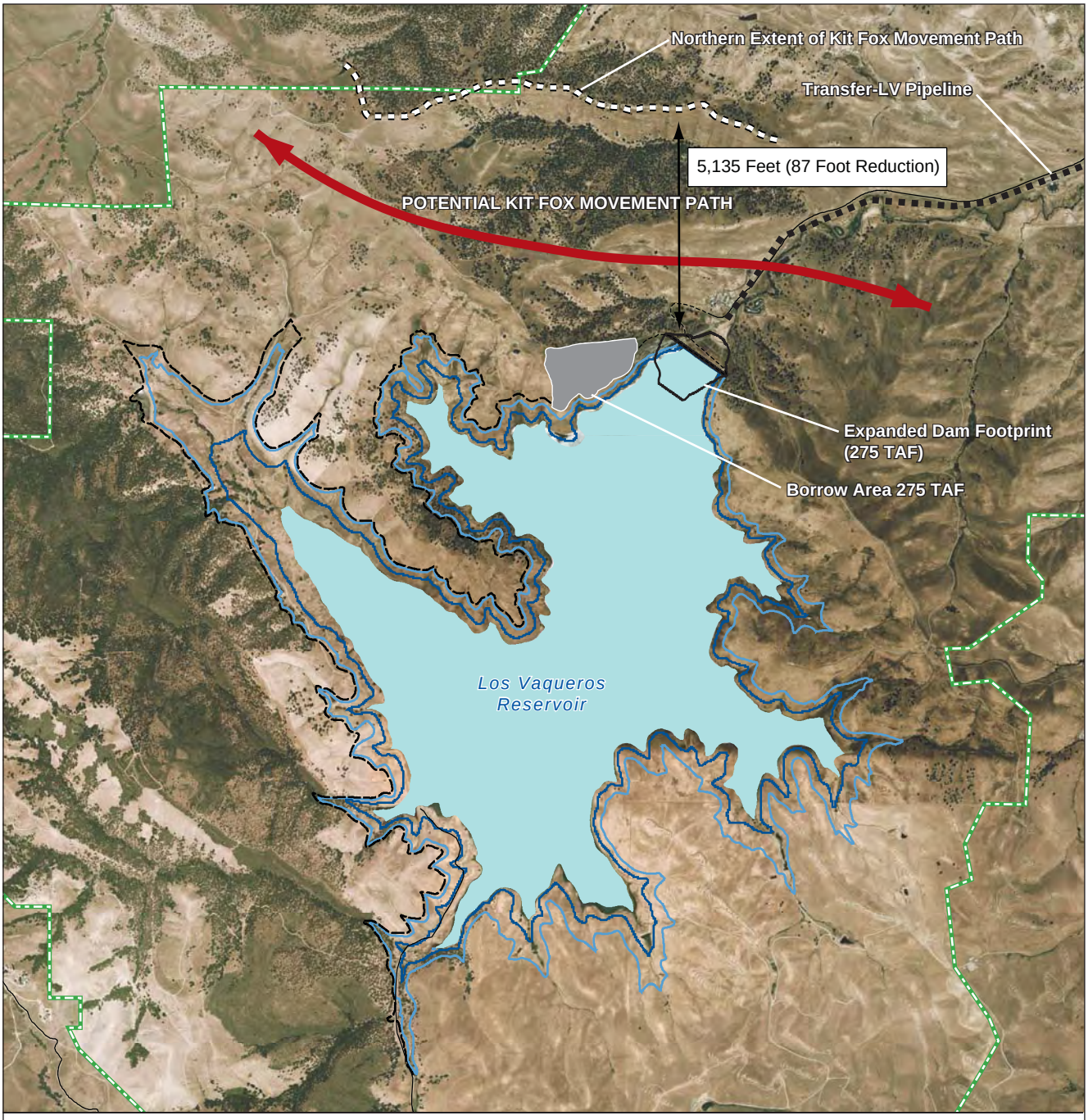
Long-term temporary habitat disturbances in the Inlet/Outlet Pipelines construction area would last a period of at least 2 years during construction of Los Vaqueros Dam and other facilities. During this extended period these areas would be unavailable for kit fox habitation or movement. While these impacts are in essence temporary, during ongoing consultation, CDFG and USFWS have indicated that such long-term habitat disturbances require greater compensation than typically applied for short-term temporary impacts (i.e., greater than a 1.1:1 replacement ratio).

**Direct Impacts to Potential Movement Corridors.** In 1993, the USFWS acknowledged that construction of the existing Los Vaqueros Reservoir would partially obstruct kit fox dispersal between the Herdlyn watershed (south and east of the reservoir) and Round Valley (north of the reservoir) (USFWS, 1993a). A September 2008 kit fox sighting near the Los Vaqueros Watershed Administrative Offices suggests that the Los Vaqueros Watershed still provides potential dispersal opportunities for regional kit fox movement. Anecdotal observations made around 2006 suggest possible kit fox activity at Round Valley Regional Preserve (Larsen, pers. comm.) with access possibly gained through watershed lands.

Declines in regional San Joaquin kit fox populations have been evident since surveys were initially conducted in the 1960s and 1970s (Jones and Stokes, 1992). While recent distribution data from CDFG, USFWS (unpublished GIS data), and the CNDDB (CDFG, 2008) suggest possible fox populations in the Black Diamond Mines area, near Brushy Peak, and along the eastern fringe of the Altamont Hills, the number of breeding foxes is not known from year to year.

Within the watershed, large tracts of grassland surrounding the reservoir on the north, east, and south have been identified as the some of the most important remaining routes for kit fox movement in the watershed. After reservoir expansion, these movement corridors would remain largely intact. The eastern, northeast and northern sides of the reservoir would continue to provide potential dispersal and cover habitat. This general movement corridor area would remain a link between Round Valley and important kit fox areas south and east of the watershed. The reservoir expansion would incrementally reduce the size of this corridor area north of the reservoir from about 5,222 to 5,135 feet (a distance about 87 feet at its narrowest point) (see **Figure 4.6-24**). This loss of grassland habitat would not restrict potential kit fox dispersal corridors; thus, this effect on potential regional kit fox movement would be less than significant.

The proposed eastside trail would make use of existing roads to the wind power facilities. The new trail segments needed to connect the existing roads for trail continuity would not contribute to the substantial loss of annual grassland habitat available to kit foxes. However, recreational usage of the eastside trail could make this area less attractive to this species. Currently, no public access is allowed on this eastern side of the reservoir. While use of this eastside trail would be expected to be relatively low, similar to the relatively low use of the other existing trails above the reservoir, opening this area to the public could have indirect adverse effects on kit foxes.




SOURCE: USGS, 1993 (base map); CCWD, 2006; CCC, 2007; and ESA, 2007

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**Figure 4.6-24**

Impacts to the Kit Fox Movement Corridor Located Northeast of Los Vaqueros Reservoir

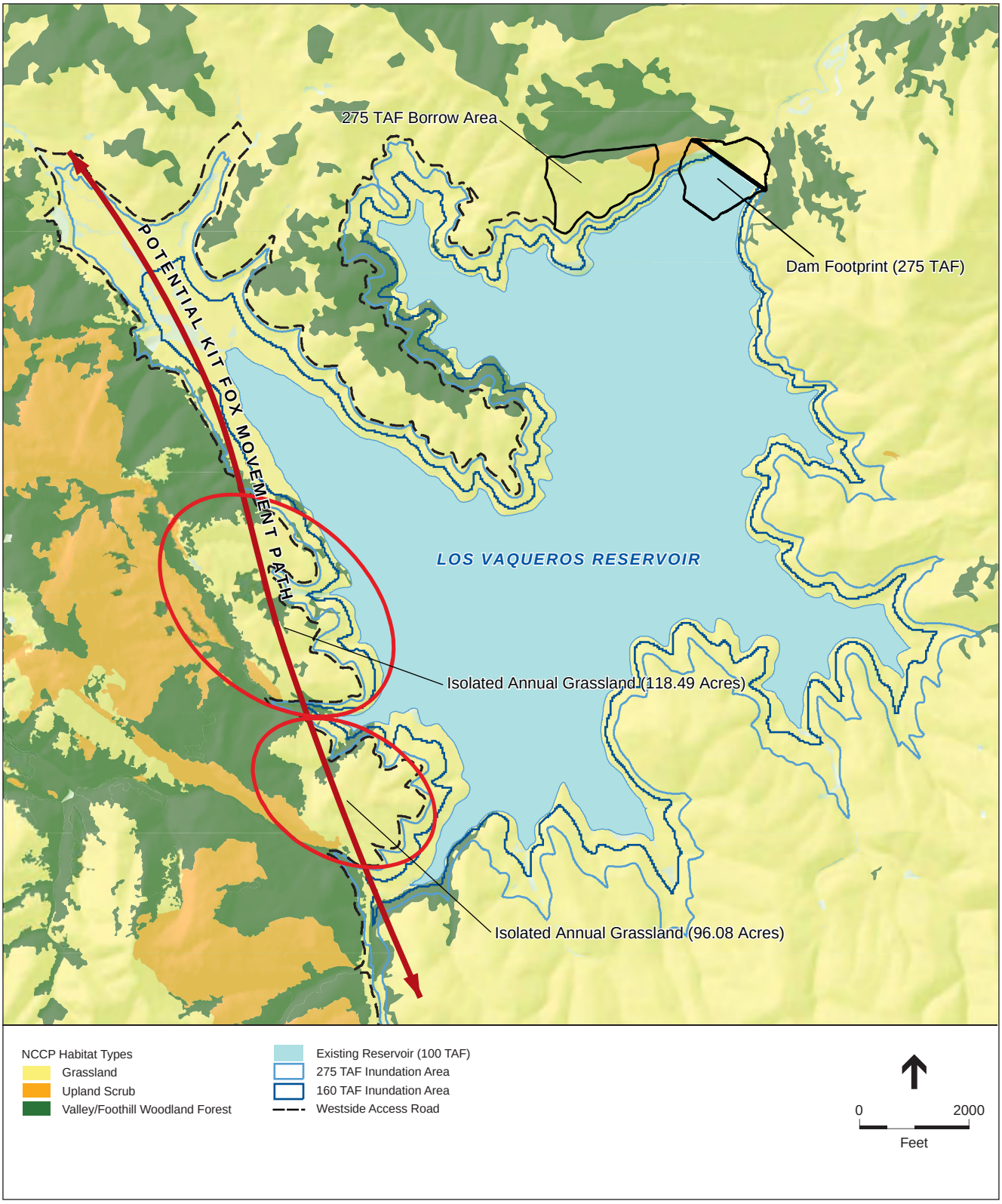
On the western side, reservoir expansion to 275 TAF would inundate the remaining grassland area, thereby eliminating a potential kit fox movement corridor. This area is currently a 1,000- to 2,000-foot-wide strand of annual grasslands, with a few areas of oak woodland intrusion. With reservoir expansion, the waterline would seasonally inundate annual grasslands along this corridor and advance into upslope oak woodland habitat (see **Figure 4.6-25**). Assuming kit foxes use this corridor, the oak woodland habitat would represent a movement barrier for kit foxes. The loss of this potential western movement corridor is considered a potentially significant and unavoidable impact on San Joaquin kit fox movement opportunities.

Mitigation through land acquisition and habitat protection is proposed to preserve and enhance other existing regional movement corridors, particularly those with documented use. However, while this mitigation may preserve effective regional movement corridors for kit fox in the eastern Contra Costa County region, information about kit fox movement in this area is insufficient to confirm that this mitigation would fully lessen the potential effects of reservoir expansion. As a result, this impact to this potential kit fox movement corridor is considered significant and unavoidable.

**Indirect Impacts.** Three potential indirect impacts on San Joaquin kit fox would result from the project: (1) isolation of annual grasslands on the western side of the reservoir due to inundation, (2) the potential for increased predation of kit fox by coyotes, and (3) habitat disturbances in the Inlet/Outlet Pipelines construction area during construction that, while temporary, could extend for 3 years and render this area unusable as a movement corridor during that period. Concurrent with dam construction, however, the reservoir would be fully drained and dried, opening additional movement opportunities for kit fox in the western portion of the reservoir. These impacts are discussed in the following paragraphs. Some reservoir facilities would require nighttime lighting for safety and security, both during and after construction. Limited nighttime lighting is not expected to have a substantial effect on kit fox populations.

*Grassland Isolation.* On the western side of Los Vaqueros Reservoir, inundation to the 275-TAF level would raise the waterline into oak woodland habitat along much of the shoreline. Two large grassland areas (118.5 acres and 96.1 acres) would not be inundated or directly affected by the project (see Figure 4.6-25); however, reservoir inundation would isolate these areas from surrounding grasslands and render them inaccessible to kit fox. As a result, the project would contribute to the indirect loss of 214.6 acres of grassland habitat for kit fox habitation and dispersal.

*Coyote Predation.* Focused surveys performed by CCWD from 1996 through 2007 (CCWD, 2006) and anecdotal evidence (Mueller, pers. comm.) suggest that coyote populations have increased within the watershed since reservoir filling in 1998. The increase in local coyote populations since the mid-1990s could be directly related to land use changes that occurred after creation of the Los Vaqueros Reservoir. Two factors in particular, the increase in anthropogenic food sources for coyotes and the removal of coyote control measures, may have increased competitive pressure on San Joaquin kit foxes within the watershed and in neighboring lands at the Round Valley Regional Preserve and Vasco Caves Regional Preserve. Red foxes and feral dogs have not been identified as a threat to kit foxes in the Los Vaqueros Watershed.




SOURCE: USGS, 1993; CCWD, 2007; MWH, 2007; and ESA, 2008

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**Figure 4.6-25**

Impacts to the Kit Fox Movement Corridor
West of Los Vaqueros Reservoir

Though coyotes are not documented to eat San Joaquin kit foxes, they have been cited as a main source of kit fox mortality where populations of these species overlap (Cypher and Spenser, 1998; Disney and Spiegel, 1992; Ralls and White et al., 1995) and possibly rank among the greatest threats to kit fox recovery in the watershed. It is suggested that coyotes kill kit foxes to reduce competition for food and other resources, as the two species rely on somewhat similar food items—principally rabbits for coyotes and small rodents for kit fox (White et al., 1994; Cypher and Scrivner, 1992). Thus, lower abundance of coyotes by means of predator control could initiate higher abundance of kit foxes. Without some means of control, it is anticipated that coyote populations would remain stable in the watershed after reservoir expansion. Because coyote populations are expected to remain essentially neutral with or without reservoir expansion, the project is not expected to negatively affect coyote/kit fox interactions.

*Long-term Temporary Impacts.* Construction of the Inlet/Outlet Pipelines would occur over a 2-year period, rendering this area temporarily unusable as a potential kit fox movement corridor. Concurrent with Los Vaqueros Dam construction, the reservoir would be fully drained and additional kit fox movement opportunities would be temporarily available in the western portion of the reservoir. Thus, the project would temporarily alter kit fox migration pathways in the watershed. It is expected that the reservoir would be completely dry within months after water drawdown and that kit foxes would have a direct overland route across the dry reservoir within 1 to 3 months of draining. This route would require traversing less than a mile of relatively barren mineral soil and dry clay, a significant reduction in travel distances from the Round Valley region to areas south of the Los Vaqueros Reservoir. Kit foxes have been known to travel up to 6 miles in a single day and virtually all their movements occur at night; thus, the lack of cover or refugia features is not expected to decrease the potential use of reservoir areas for overland migration. This route would be available during construction of the Inlet/Outlet Pipelines. As a result, construction of the reservoir Inlet/Outlet Facilities is not expected to contribute additional indirect impacts to kit fox.

### New Delta Intake and Pump Station

The new Delta Intake and Pump Station site is on the eastern fringe of the San Joaquin kit fox range, and the area provides marginal habitat for kit foxes (USFWS, unpublished data; see Figure 4.6-10). Based on their known range and available habitat near the Delta Intake Facilities, kit foxes may be encountered in this area during construction.

### Delta-Transfer, Transfer-LV, and Transfer-Bethany Pipelines

Each of the proposed pipeline alignments generally support annual grasslands and oak woodland habitat that provide potential moderate to high quality San Joaquin kit fox denning, foraging, and dispersal habitat. Virtually all grasslands and oak woodland habitat in these alignments are believed to provide habitat benefits and values for kit foxes. The alignments are generally described below and impacts to them are presented in **Table 4.6-13**:

- The Delta-Transfer Pipeline alignment west of SR 4 is thought to provide at least moderate quality dispersal and denning habitat for San Joaquin kit fox.

**TABLE 4.6-13**
**SUMMARY OF IMPACTS ON SAN JOAQUIN KIT FOX HABITAT ALONG PIPELINE ALIGNMENTS**

| Pipeline | Length (miles) | Habitat Usage | Temporary Impacts on Grassland Habitat (acres) | Permanent Impacts |
|---|---|---|---|---|
| Delta-Transfer | 6.8 | Potential denning, foraging, and dispersal habitat | 39.4 | Limited to vaults, manholes, blow-off valves, or vents along the pipeline alignment |
| Transfer-LV | 4.3 | Potential denning, foraging, and dispersal habitat | 76.5 | |
| Transfer-Bethany | 7.7 (excludes southern tunnel/pipeline segment) | Moderate to high quality dispersal and denning | 150.9 | |

SOURCE: ESA unpublished data, 2006-2008

- The Transfer-LV Pipeline alignment traverses moderate quality annual grasslands that are subject to ongoing disturbances from watershed management and recreational activities.
- The Transfer-Bethany Pipeline alignment traverses the eastern kit fox dispersal corridor where kit foxes have been sighted in recent years (CDFG, 2008; USFWS file data). This area is assumed to provide high quality habitat for this species.

Permanent habitat impacts would be limited because the pipelines would be mostly below-grade and areas would be restored after construction. The extent of habitat that would be permanently affected by installation of the access vaults, blow-off valves, or vents along the pipeline alignments is minimal (less than 0.5 acre total based on existing pipelines). The pipeline facilities are not anticipated to affect long-term San Joaquin kit fox movements or population distribution. Other than these features, pipelines would not have permanent habitat impacts.

### Expanded Transfer Facility

Construction at the Expanded Transfer Facility site would permanently impact 1.2 acres of low quality annual grasslands habitat that could be used by San Joaquin kit fox. This area is presently surrounded with security fencing that inhibits kit fox access, and is ungrazed and supports tall, extremely dense herbaceous vegetation, principally mustards, that is considered sub-optimal as kit fox habitat.

#### Existing Mitigation Commitments

At present, 4,150 acres of land in the watershed have been conveyed to CDFG as a kit fox conservation easement, and 1,856 acres have been proposed to be conveyed (see Figure 4.6-14). Under Alternative 1, reservoir expansion would permanently inundate 372.4 acres of annual grasslands, 40.7 acres of valley foothill woodland and riparian habitat, and 0.4 acre of upland scrub within existing conservation easements for San Joaquin kit foxes. Another 67.9 acres of

grasslands habitat within kit fox conservation easements would be permanently impacted to accommodate the borrow area (37.8 acres), dam (4.6 acres), westside access road (23.3 acres), and other parking, picnic, and road facilities (2.1 acres). These facilities would also permanently affect 9.1 acres of woodland and riparian forest habitat and 6.2 acres of upland scrub habitat within conservation easements.

Owing to construction, temporary impacts within kit fox conservation easements would total an additional 35.8 acres and include 31 acres of annual grasslands (up to 20.0 acres in the Inlet/Outlet Pipelines construction area; 11.0 acres for the westside access road; and 1.0 acre for other parking, picnic, and road facilities), 3.8 acres of woodland habitats, and 0.3 acre of upland scrub habitat.

Indirect impacts on San Joaquin kit fox CDFG conservation easements are anticipated on the western side of Los Vaqueros Reservoir, where inundation to the 275-TAF level places the reservoir shoreline waterline directly against oak woodland habitat, thereby isolating annual grasslands that would not be inundated (see Figure 4.6-25). The overall conservation value of these isolated areas would be substantially reduced as dedicated conservation lands because reservoir inundation would isolate these features from surrounding grasslands, potentially making them inaccessible to kit foxes. As a result, the project would cause the indirect reduction in conservation value to 214.6 acres of grassland habitat.

### Power Supply Infrastructure

**Power Option 1: Western Only.** The Western study area is on the eastern edge of the San Joaquin kit fox range, and provides moderate to good quality habitat for this species. Impacts from powerlines would be minimal, with temporary habitat impacts during construction.

The Western substation would permanently affect 2.0 acres of annual grasslands habitat within the active range of the kit fox. The permanent access road to the substation facility, most likely from Camino Diablo Road, would likely use existing road easements with minimal habitat impacts.

**Power Option 2: Western and PG&E.** The PG&E substation would affect an estimated 2 acres of moderate to good quality annual grasslands habitat that may be used by kit foxes. Impacts from powerlines would be minimal.

As identified for Option 1, impacts from powerlines would be minimal in the Western powerline alignment.

### Summary for Alternative 1

Under Alternative 1, the project would directly and indirectly impact San Joaquin kit fox habitat in several locations and permanently reduce potential regional movement opportunities in one location. The greatest habitat impact in terms of vegetation occurs to the grassland vegetation community, which provides potential kit fox denning, foraging, and dispersal. To a lesser degree, dispersal and coverage habitat provided by oak woodlands and coastal scrub would also be impacted. A potential movement corridor would be eliminated on the west side of the reservoir after

inundation. Indirect effects include grassland isolation, risk for increased competition by coyotes, and sustained habitat disturbances related to project construction. Many of these impacts would occur on lands that currently are subject to kit fox mitigation easements.

Impacts related to Alternative 1 would be significant prior to mitigation, but most can be mitigated to a less-than-significant level through protection measures and incorporation of onsite and offsite compensatory mitigation. Loss of a potential movement corridor on the western side of the reservoir remains a significant project effect that cannot be mitigated. Alternative 1 impacts would be reduced through implementation of Mitigation Measure 4.6.7a, which serves to identify kit fox in the area and protect them during project construction; Mitigation Measure 4.6.7b, which provides for the acquisition and dedication of lands into conservation easements or the purchase of mitigation credits; and Mitigation Measures 4.6.7c, which requires acreage replacement within the watershed.

### *Alternative 2*

Potential impacts to San Joaquin kit fox, their habitat, and migration opportunities under Alternative 2 would be the same as those discussed for Alternative 1. As a result, Alternative 2 would have significant direct and indirect impacts before mitigation. After the implementation of Mitigation Measures 4.6.7a, 4.6.7b, and 4.6.7c, most impacts to San Joaquin kit foxes would be mitigated to a less-than-significant level; however, the loss of the western movement corridor presents a significant unavoidable impact to potential San Joaquin kit fox migration pathways.

### *Alternative 3*

Under Alternative 3, potential impacts to San Joaquin kit foxes within the watershed would be the same as those described for Alternative 1. The reservoir would be expanded to the same 275 TAF capacity and have the same in-watershed footprint as under Alternative 1.

Because Alternative 3 does not include the Transfer-Bethany Pipeline, potential temporary impacts to moderate to high quality kit fox dispersal and denning habitat would not occur in this area. In the absence of the 7.7-mile pipeline alignment (and 1.4-mile to 2.2 mile tunnel/pipeline) this alternative would impact at least 150.9 fewer acres of grasslands habitat suitable for kit fox compared to Alternative 1.

Expansion of the Old River Intake and Pump Station proposed under this alternative would not involve any physical site changes modification or disturbance either on the land or in the water. Therefore there would be no impact to kit fox at this site.

These impacts constitute significant direct and indirect impacts to San Joaquin kit fox and their habitat before mitigation. After the implementation of Mitigation Measures 4.6.7a through 4.6.7c, most impacts to the San Joaquin kit fox would be mitigated to a less-than-significant level. As with Alternatives 1 and 2, the loss of the western movement corridor would constitute a significant, unavoidable impact of Alternative 3.

## *Alternative 4*

### Direct Impacts to Habitat

Direct habitat impacts to San Joaquin kit fox habitat under Alternative 4 would be less than under Alternative 1. The 160 TAF reservoir expansion would permanently impact 498.5 acres of annual grasslands habitat and 22.1 acres of oak woodland habitat; both of these habitats are thought to provide potential kit fox denning, foraging, or dispersal habitat. These acreage figures include land both within and outside of dedicated CDFG kit fox conservation easements.

Alternative 4 does not include the Delta-Transfer Pipeline, Transfer-Los Vaqueros Pipeline, or Transfer-Bethany Pipeline; therefore, potential temporary impacts to moderate to high quality kit fox dispersal and denning habitat would not occur in these areas. In the absence of these pipeline alignments, this alternative would impact roughly 266.8 fewer acres of annual grasslands habitat than Alternative 1 (Table 4.6-13).

The 160-TAF borrow area is in a relatively level area west of Kellogg Creek that provides a potential movement corridor for kit fox. Long-term temporary habitat impacts would occur in an area measuring about 16.5 acres (600 feet by 1,200 feet) where soils would be excavated to a depth of about 10 feet. After soil removal, the borrow area would be replanted to annual grasslands.

### Direct Impacts to Potential Movement Corridors

Reservoir expansion to 160 TAF would not significantly affect the large tracts of grassland surrounding the reservoir on the north, east, and south that serve as potential routes for kit fox movement through the watershed. After reservoir expansion, these movement corridors would remain largely intact. The eastern and northern sides of the reservoir would continue to provide potential dispersal and cover habitat. This general movement corridor area would remain a link between Round Valley and important kit fox areas south of the watershed. The eastern-northern movement corridor would be reduced less than 50 feet in width under Alternative 4, from an estimated 5,222 feet at the narrowed point to 5,172 feet after reservoir expansion (Figure 4.6-24). If kit fox movement opportunities are currently presumed in this corridor, the incremental narrowing of suitable habitat is not expected to appreciably affect the continued use of this area.

On the western side of the reservoir, reservoir expansion to 160 TAF would inundate some of the remaining grassland area that represents a potential kit fox movement corridor. As shown on Figure 4.6-24, the 160-TAF reservoir would inundate less of this grassland area than the 275-TAF reservoir, such that more grasslands would remain. However, inundation would effectively eliminate this area as a kit fox movement corridor. After expansion to the 160-TAF level, the waterline would abut the edge of oak woodland habitat and, assuming kit fox can presently use this corridor, would present a movement barrier for kit fox.

Mitigation through land acquisition and habitat protection is proposed to preserve and enhance other existing regional movement corridors, particularly those with documented use. However, while this mitigation may preserve effective regional movement corridors for kit fox in the eastern

Contra Costa County region, information about kit fox movement in this area is insufficient to confirm that this mitigation would fully lessen the potential effects of reservoir expansion.

### Existing Mitigation Commitments

Reservoir expansion under Alternative 4 would permanently inundate 150.3 acres of annual grasslands and 20.7 acres of valley foothill woodland and riparian habitat that are within existing conservation easements for San Joaquin kit fox (Figure 4.6-14). Similar to Alternative 1, additional grasslands habitat within kit fox conservation easements, totaling about 67 acres, would be permanently affected to accommodate the borrow area, dam, and other facilities.

Indirect impacts on a San Joaquin kit fox CDFG conservation easement are anticipated on the western side of Los Vaqueros Reservoir, where the 160-TAF waterline would be next to oak woodland habitat, and would consequently isolate annual grasslands that would not be inundated (see Figure 4.6-23). The overall conservation value of these dedicated kit fox conservation easement lands would be reduced because they would be essentially isolated from surrounding grasslands and inaccessible to some wildlife species, including San Joaquin kit fox. As a result, the project would cause the indirect reduction in conservation value to 301.4 acres of grassland habitat. Note that indirect impacts are higher under Alternative 4 than under Alternative 1 because, while total inundation of grasslands is less under Alternative 4, a greater amount of remaining grassland acreage would become isolated west of the reservoir.

### Summary

Direct habitat impacts under Alternative 4 would be less than under Alternative 1 due to the exclusion of the Transfer-Bethany, Delta-Transfer, and Transfer-Los Vaqueros Pipelines. With the absence of these features the project would impact 266.8 fewer acres of annual grassland habitat. Under Alternative 4, the project would impact fewer acres of annual grasslands (498.5 acres, versus 976.2 acres under Alternative 1) and oak woodlands habitat (20.7 acres, versus 81.1 acres under Alternative 1) that may be used by kit foxes. Both Alternatives 1 and 4 effectively eliminate the western side of the reservoir as a kit fox movement corridor.

Alternative 4 has greater indirect impacts to kit fox conservation lands west of the reservoir because more non-inundated grasslands would become inaccessible to kit fox (301.4 acres) compared with Alternative 1 (214.6 acres). Fewer indirect impacts would occur to these conservation areas under Alternative 1 (i.e., less grasslands would be isolated); however, more conservation lands would be directly inundated, producing a similar overall effect on kit fox habitat availability. Prior to mitigation, Alternative 4 would have significant direct and indirect impacts on San Joaquin kit fox and their habitat. After Mitigation Measures 4.6.7a through 4.6.7c are implemented, most impacts to San Joaquin kit fox would be mitigated to a less-than-significant level. As with the other alternatives, Alternative 4 would cause the loss of the western movement corridor, which would constitute a significant, unavoidable impact to the potential San Joaquin kit fox movement corridor.

### Mitigation Measures

**Measure 4.6.7a:** CCWD shall implement San Joaquin kit fox protection measures. The following measures, which are intended to reduce direct and indirect project impacts on San Joaquin kit foxes, are derived from the *San Joaquin Kit Fox Survey Protocol for the Northern Range* (USFWS, 1999a) and the *Standardized Recommendations for Protection of the San Joaquin Kit Fox* (USFWS, 1999b). These measures shall be implemented for construction areas along pipeline corridors, staging areas, and facilities within the watershed:

- Preconstruction surveys shall be conducted within 200 feet of work areas to identify potential San Joaquin kit fox dens or other refugia in and surrounding workstations. A qualified biologist shall conduct the survey for potential kit fox dens 14 to 30 days before construction begins. All identified potential dens shall be monitored for evidence of kit fox use by placing an inert tracking medium at den entrances and monitoring for at least 3 consecutive nights. If no activity is detected at these den sites, they shall be closed following guidance established in USFWS Standardized Recommendations document.

- If kit fox occupancy is determined at a given site, the construction manager should be immediately informed that work should be halted within 200 feet of the den and the USFWS contacted. Depending on the den type, reasonable and prudent measures to avoid effects to kit foxes could include seasonal limitations on project construction at the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence.

- To minimize the possibility of inadvertent kit fox mortality, project-related vehicles shall observe a maximum 20 miles per hour speed limit on private roads in kit fox habitat. Nighttime vehicle traffic shall be kept to a minimum on nonmaintained roads. Off-road traffic outside the designated project area shall be prohibited in areas of kit fox habitat.

- To prevent accidental entrapment of kit fox or other animals during construction, all excavated holes or trenches greater than 2 feet deep shall be covered at the end of each work day by suitable materials, fenced, or escape routes constructed of earthen materials or wooden planks shall be provided. Before filling, such holes shall be thoroughly inspected for trapped animals.

- All food-related trash items (such as wrappers, cans, bottles, and food scraps) shall be disposed of in closed containers and removed daily from the project area.

- To prevent harassment and mortality of kit foxes or destruction of their dens, no pets shall be allowed in the project area.

**Measure 4.6.7b:** To compensate for impacts on San Joaquin kit fox habitat outside of dedicated CDFG conservation easements, CCWD shall provide mitigation either through acquiring and dedicating lands into conservation easements or purchasing mitigation credits at compensation ratios that have been approved by state and federal resource agencies.

Consistent with MSCS and USFWS guidance, mitigation ratios applied for impacts on San Joaquin kit fox habitat shall be 1:1 to 1.1:1 for temporary impacts; 1:1 to 2:1 for long-

term temporary impacts; and 1:1 to 3:1 for permanent impacts. CCWD shall acquire San Joaquin kit fox mitigation lands based on anticipated impacts to suitable habitat and mitigation ratios identified by the MSCS and USFWS (see **Table 4.6-14**).

San Joaquin kit fox mitigation obligations may concurrently satisfy burrowing owl mitigation obligations identified in Mitigation Measure 4.6.8, below, if suitable habitat is present for both species in mitigation lands. The availability of mitigation lands to satisfy mitigation requirements for these species is discussed in the Comprehensive Biological Resources Mitigation and Compensation Program (Section 4.6.3).

**Measure 4.6.7c:** CCWD shall replace any acreage of existing kit fox easement affected by the project with an equivalent amount of acreage within the watershed to maintain under conservation easement the full amount required for the original Los Vaqueros Reservoir Expansion Project. In addition, CCWD shall provide compensation for conservation easement acreage affected at a ratio of up to 3:1, including conservation easement lands that are isolated by the project (see Table 4.6-14). Compensation for temporary impacts to lands within conservation easements shall be provided at a ratio of 1:1 to 1.1:1.

**Impact Significance after Mitigation:** Less than significant for habitat impacts except loss of the potential movement corridor on the western side of the reservoir, which would remain a significant and unavoidable effect of the project under all project alternatives. Although the proposed mitigation program includes acquisition of habitat acres to compensate for the grassland acres affected by reservoir expansion, and the program also proposes acquisition of compensatory habitat in areas that preserve remaining movement corridors for the kit fox, these measures would not reduce or avoid the loss of the grassland along the western side of the reservoir. The loss of most of this grassland strip to inundation and therefore of this specific potential movement corridor is unavoidable.

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**Impact 4.6.8: Project construction would result in temporary and permanent loss of habitat for burrowing owl. (Less-Than-Significant with Mitigation)**

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

Construction activities related to the expansion of the Los Vaqueros Reservoir, access roads, and recreational facilities (e.g., trails and picnic areas) would require grading and excavation of 1,022.0 acres of California annual grasslands and purple needlegrass grasslands. Most temporary impacts (45.8 acres) would occur during project construction, whereas the permanent impact (976.2 acres) would occur when the reservoir is filled. The proposed reservoir footprint is in or next to potential burrowing owl breeding and nonbreeding habitat, and is considered to provide varying degrees of habitat quality for this species. Focused owl surveys have not been conducted to document the local distribution of this species near the reservoir, but nonbreeding owls are documented in the area and should be presumed present in all potentially suitable grassland habitats. Burrowing owls in this area would be exposed to direct and indirect project impacts.

**TABLE 4.6-14**
**SUMMARY OF SAN JOAQUIN KIT FOX HABITAT IMPACTS**

| | | HABITAT IMPACTS (ACRES) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Impacted Nonconservation Lands | | | Impacted CDFG Kit Fox Conservation Lands | | | |
| | | Temporary | Long-Term Temporary[c] | Permanent | Temporary | Long-Term Temporary | Permanent | Isolated SJKF Grasslands |
| Alternatives 1 and 2 | | | | | | | | |
| *Grassland Impacts* | | | | | | | | |
| In-watershed | | 15,8 | 0.0 | 535.9 | 11.0 | 20.0 | 440.3 | 214.6 |
| Out-of-watershed | | 266.8 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **Subtotal** | 282.6 | 0.0 | 537.1 | 11.0 | 20.0 | 440.3 | 214.6 |
| | | ***Total Alternative 1 and 2 Grassland Impact: 1,505.6 acres*** | | | | | | |
| ***Mitigation Ratios*** | | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 3:1 |
| ***Grasslands Compensation Acreage*** | | 282.6 to 310.9 | 0.0 | 537.1 to 1,611.3 | 11.0 to 12.1 | 20.0 to 40.0 | 440.3 to 1,320.9 | 214.6 to 643.8 |
| | | **Alternative 1 and 2 Grassland Mitigation Requirement: 1,505.6 to 3,939.0 acres** | | | | | | |
| Alternative 3 | | | | | | | | |
| *Grassland Impacts* | | | | | | | | |
| In-watershed | | 15.8 | 0.0 | 535.9 | 11.0 | 20.0 | 440.3 | 214.6 |
| Out-of-watershed | | 115.9 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **Subtotal** | 131.7 | 0.0 | 537.1 | 11.0 | 20.0 | 440.3 | 214.6 |
| | | ***Total Grassland Impact : 1,354.7 acres*** | | | | | | |
| ***Mitigation Ratios*** | | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 3:1 |
| ***Grasslands Compensation Acreage*** | | 131.7 to 144.9 | 0 | 537.1 to 1,611.3 | 11.0 to 12.1 | 20.0 to 40.0 | 440.3 to 1,320.9 | 214.6 to 643.8 |
| | | **Alternative 3 Grassland Mitigation Requirement: 1,354.7 to 3,773.0 acres** | | | | | | |
| Alternative 4 | | | | | | | | |
| Grasslands | | | | | | | | |
| In-watershed | | 19.2 | 0.0 | 348.2 | 0.0 | 0.0 | 150.3 | 301.4 |
| Out-of-watershed | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **Subtotal** | 19.2 | 0.0 | 348.2 | 0.0 | 0.0 | 150.3 | 301.4 |
| | | ***Total Grassland Impact : 819.1 acres*** | | | | | | |
| ***Mitigation Ratios*** | | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 3:1 |
| ***Grasslands Compensation Acreage*** | | 19.2 to 21.1 | 0.0 | 348.2 to 1,044.6 | 0.0 | 0.0 | 150.3 to 450.9 | 301.4 to 904.2 |
| | | **Total Grassland Mitigation Requirement: 819.1 to 2,420.8 acres** | | | | | | |

[a] "Long-term temporary" impacts are distinguished from temporary and permanent impacts to describe temporary habitat disturbances with a duration lasting longer than one growing season. Permanent impacts, as used in this section, are those that would permanently alter the landscape with no return to pre-project conditions. The USFWS generally considers "long-term temporary" effects (i.e., effects with a duration of greater than one growing season) as a permanent impact.

Burrowing owls are considered to have patchy, disjunctive distribution in the regional project vicinity. Where present, they often occur in large numbers. For example, sizeable groups of burrowing owl were noted in an approximately 100-acre area near Brushy Creek at Dyer Road (up to 14 pairs) as well as at a second site about 5 miles east of Dyer Reservoir, where J. Barclay (unpubl. data) recorded up to seven owl pairs around the perimeter of a 140-acre site. No records from CCWD or the CNDDB note burrowing owl colonies or aggregations in or near the reservoir expansion footprint.

Expansion of the reservoir would indirectly affect burrowing owls through the loss of habitat (foraging, roosting, and wintering habitat). Construction and earthmoving activities could affect burrowing owls through direct mortality of adults or nestlings if nest burrows are in areas where the soil is disturbed. Construction activities could also affect nesting burrowing owls by disrupting adult reproductive behavior if owl pairs were nesting within 500 feet of construction during the nesting season (March–June).

### New Delta Intake and Pump Station

Although upland agricultural areas in the Delta Intake and Pump Station vicinity might theoretically be used by burrowing owls for foraging, and the levees could support burrows as nesting habitat, no known burrowing owl nesting habitat lies within 500 feet of the study area vicinity. Based on the known distribution of this species and preliminary reconnaissance survey findings, construction and operations of the Delta Intake and Pump Station are not expected to directly or indirectly affect burrowing owls.

### Delta-Transfer, Transfer-LV, and Transfer-Bethany Pipelines

The Delta-Transfer Pipeline alignment traverses cropland and grassland habitat, and the Transfer-LV and Transfer-Bethany Pipelines would traverse grassland habitat that might be used by burrowing owl for foraging and breeding. During reconnaissance surveys in spring 2007, biologists identified high quality burrowing owl nesting and foraging habitat along the length of each of the pipeline alignments. **Table 4.6-15** summarizes known occurrences and potential impacts that construction of each pipeline would have on burrowing owls and their habitat. Active burrowing owl nests and satellite burrows have not been detected along the various alignments.

### Expanded Transfer Facility

The Expanded Transfer Facility site is near tall grasslands habitat that likely is not used by burrowing owls, although the tall grassland should be considered potentially occupied habitat. Burrowing owls are not known to occur near the Transfer Facility. Construction-related impacts on this species would include temporary disturbance of grassland habitat, which would be restored with native vegetation after construction is completed. Permanent impacts would include the loss of 1.22 acres of grassland habitat associated with the balancing reservoir. Permanent direct impacts on burrowing owls are not expected from this facility.

**TABLE 4.6-15**
**SUMMARY OF BURROWING OWL OCCURRENCES AND POTENTIAL IMPACTS**

| Pipeline | Length (miles) | CNDDB Occurrences | Reconnaissance Survey | Potential Impacts |
|---|---|---|---|---|
| Delta-Transfer | 6.8 | None documented within 500 feet | None observed | Likelihood of direct impacts is considered low to moderate due to agricultural activities. Habitat usage is considered minimal. |
| Transfer-LV | 4.3 | None documented within 500 feet | None observed | Likelihood of direct impacts is considered low to moderate due to high vehicle traffic and recreational usage. Habitat usage is considered minimal. |
| Transfer-Bethany | 8.5 | None documented within 500 feet, several documented in areas greater than 500 feet | None observed | Likelihood of direct impacts is moderate to high due to high quality annual grasslands habitat. |

SOURCE: ESA 2008

### Power Supply Infrastructure

**Power Option 1: Western Only.** Impacts from powerlines would be minimal, with temporary habitat impacts during construction.

The Western substation would permanently impact 2 acres of annual grasslands habitat in an area that does not support owl breeding. Though not previously identified from the area, the permanent access road to the substation facility may support burrowing owl breeding; thus, road construction may cause temporary habitat impacts to this species.

**Power Option 2: Western and PG&E.** A pair of breeding burrowing owls was identified in the Power Option 2 Western powerline alignment during spring 2008 reconnaissance surveys, and the corridor provides patches of moderate quality burrowing owl nesting habitat (B. Pittman, pers. obs.). Impacts from powerlines would be minimal, with temporary habitat impacts during construction.

Burrowing owls have not been identified at the PG&E substation or within the powerline alignment, and based on reconnaissance surveys are not expected in the study area.

### Existing Mitigation Commitments

No burrowing owl mitigation commitments have been established for the Los Vaqueros Reservoir Expansion Project.

### Summary for Alternative 1

Under Alternative 1, the project would directly impact burrowing owls and their habitat through grading and excavation of grasslands and reservoir inundation. Grading and excavation constitute temporary impacts to 45.8 acres, and 976.2 acres would be permanently impacted when the reservoir is filled. This species could also be encountered at virtually any location on the Delta-Transfer Pipeline, Transfer-LV Pipeline, and Transfer-Bethany Pipeline. Impacts related to Alternative 1 would be significant prior to mitigation. Alternative 1-related impacts would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.8a, which provides for surveys and protection measures during construction; and Mitigation Measure 4.6.8b, which provides compensation for impacts through land acquisition and dedication to a conservation easement and/or participation in a mitigation bank.

## *Alternative 2*

Potential impacts to the burrowing owl and its habitat due to project implementation under Alternative 2 would be the same as those discussed for Alternative 1, and constitute a significant impact prior to mitigation. Alternative 2-related impacts would be reduced to a less-than-significant level through implementation of Mitigation Measures 4.6.8a and 4.6.8b.

## *Alternative 3*

Potential impacts to the burrowing owl and its habitat due to project implementation under Alternative 3 would be similar to those discussed for Alternative 1 within the reservoir and along the Delta-Transfer pipeline, the Transfer-LV pipeline, and the electrical transmission facilities. However, overall impact to this species would be less because this alternative does not include construction of the Transfer-Bethany Pipeline, which would affect moderate to high quality burrowing owl habitat. Alternative 3 would therefore impact at least 150.9 fewer acres of grasslands habitat compared to Alternative 1, and the likelihood of encountering burrowing owls on the project would be reduced.

The Expanded Old River Intake and Pump Station would be constructed within the existing facilities footprint; therefore, no permanent impacts would occur on any upland burrowing owl foraging habitat. Based on the known distribution of this species and preliminary reconnaissance survey findings, construction and operations of the Expanded Old River Intake and Pump Station are not expected to directly or indirectly affect burrowing owls. No impacts are anticipated at this site.

Potential direct and indirect impacts to burrowing owls within the Los Vaqueros Watershed and on the Delta-Transfer Transfer-LV pipeline alignments are considered significant before mitigation. The implementation of Mitigation Measures 4.6.8a and 4.6.8b would reduce these potential impacts to a less-than-significant level.

### *Alternative 4*

Grasslands in the reservoir footprint are considered to provide potential foraging, roosting, and wintering habitat for burrowing owl. These areas provide varying degrees of habitat quality for this species and many areas are not considered suitable for owl breeding. Construction activities related to 160-TAF reservoir expansion would permanently impact 498.5 acres of annual grasslands habitat, compared with 976.2 acres under Alternative 1. Focused owl surveys have not been conducted to document the local distribution of this species near the reservoir, but this species is routinely documented in the area and should be presumed present in all potentially suitable grassland habitats. Burrowing owls in this area would be exposed to direct or indirect project impacts from construction and reservoir inundation.

The 16.5 acre 160-TAF borrow area, which is unique to Alternative 4, provides low quality burrowing owl nesting habitat due to its low density of ground squirrel activity; however, this area is excellent foraging habitat for burrowing owls.

Direct and indirect impacts to burrowing owl under Alternative 4 are considered significant before mitigation. The implementation of Mitigation Measures 4.6.8a and 4.6.8b would reduce these potential impacts to a less-than-significant level.

#### Mitigation Measures

The implementation of Mitigation Measure 4.6.8a, which requires preconstruction surveys and protection measures to avoid burrowing owls during the breeding season, and Measure 4.6.8b, which includes the establishment of mitigation lands for loss of habitat as required by regulatory permits, would reduce potential impacts on burrowing owls to a less-than-significant level.

> **Measure 4.6.8a:** CCWD shall implement the measures listed below for grassland habitats to reduce potential impacts to a less-than-significant-level and to avoid incidental take of burrowing owls. In advance of construction, CCWD shall follow the current CDFG burrowing owl survey guidance, presently the Burrowing Owl Consortium multi-phase approach to evaluate burrowing owl use. Measures shall apply to all construction activities near active nests or within potential burrowing owl nesting habitat, to avoid, minimize, or mitigate impacts on burrowing owls:
>
> *Breeding season surveys* shall be performed to determine the presence of burrowing owls for the purposes of inventory, monitoring, avoidance of take, and determining appropriate mitigation. In California the breeding season begins as early as February 1 and continues through August 31. Under the Burrowing Owl Consortium's multi-phase survey methodology, for areas within 500 feet of construction boundaries, CCWD shall: 1) perform a habitat assessment to identify essential components of burrowing owl habitat, including artificial nest features; 2) perform intensive burrow surveys in areas that are identified to provide suitable burrowing owl habitat, and; 3) perform at least four appropriately-timed breeding season surveys (four survey visits spread evenly [roughly every 3 weeks] during the peak of the breeding season, from April 15 to July 15) to document habitat use.
>
> *Pre-construction surveys* shall be used to assess the owl presence before site modification is scheduled to begin. Initial pre-construction surveys should be conducted outside of the

owl breeding season (February 1–August 31), but as close as possible to the date that ground-disturbing activities will begin. Generally, initial pre-construction surveys should be conducted within 7 days, but no more than 30 days prior to ground-disturbing activities. Additional surveys may be required when the initial disturbance is followed by periods of inactivity or the development is phased spatially and/or temporally over the project area. Up to four or more survey visits performed on separate days may be required to assure with a high degree of certainty that site modification and grading will not take owls. The full extent of the pre-construction survey effort shall be described and mapped in detail (e.g., dates, time periods, area[s] covered, and methods employed) in a biological report that will provided for review to CDFG.

In addition to the above survey requirements, the following measures shall be implemented to reduce project impacts to burrowing owls:

- Construction exclusion areas (e.g., orange exclusion fence or signage) shall be established around occupied burrows, where no disturbance shall be allowed. During the nonbreeding season (September 1 through January 31), the exclusion zone shall extend at least 160 feet around occupied burrows. During the breeding season (February 1 through August 31), exclusion areas shall extend 250 feet around occupied burrows (or farther if warranted to avoid nest abandonment).
- If work or exclusion areas conflict with owl burrows, passive relocation of onsite owls could be implemented as an alternative, but only during the nonbreeding season and only with CDFG approval. The approach to owl relocation and burrow closure will vary depending on the number of occupied burrows. Passive relocation shall be accomplished by installing one-way doors on the entrances of burrows within 160 feet of the project area. The one-way doors shall be left in place for 48 hours to ensure the owls have left the burrow. The burrows shall then be excavated with a qualified biologist present. Construction shall not proceed until the project area is deemed free of owls.
- Unoccupied burrows within the immediate construction area shall be excavated using hand tools, and then filled to prevent reoccupation. If any burrowing owls are discovered during the excavation, the excavation shall cease and the owl shall be allowed to escape. Excavation could be completed when the biological monitor confirms the burrow is empty.
- Artificial nesting burrows will be provided as a temporary measure when natural burrows are lacking. To compensate for lost nest burrows, artificial burrows shall be provided outside the 160-foot buffer zone (CDFG, 1995). The alternate burrows shall be monitored daily for 7 days to confirm that the owls have moved in and acclimated to the new burrow.

**Measure 4.6.8b:** CCWD shall compensate for permanent habitat losses at a minimum 2:1 ratio (possibly concurrent with other mitigation commitments, such as those for San Joaquin kit fox, provided habitat is present for both species). Compensation could consist of purchasing and enhancing suitable habitat, converting it to a conservation easement, and conveying the easement to a managing agency or institution in perpetuity; participating in a resource agency-approved mitigation bank that provides offset mitigation credits for loss of burrowing owl habitat; or a combination of both. Burrowing owl mitigation areas shall support burrowing owl populations in similar or greater densities to those on impacted burrowing owl habitat.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.9: Project construction and operation activities would result in direct and indirect impacts on existing populations of and habitat for golden eagle, bald eagle, and Swainson's hawk. (Less than Significant with Mitigation; Beneficial for bald eagle foraging habitat)**

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

Golden eagles are known to nest within the watershed and could be directly and indirectly affected by the project, though nest sites shift regularly. The nearest known golden eagle occurrence to the in-watershed facilities is about 0.5 mile west of the stockpile area. An existing recreational trail, which would be inundated, runs along the western side of the reservoir and comes within 0.1 mile of a golden eagle nest site. A golden eagle nest site is 16 feet from the shoulder of the proposed westside access road (see Figure 4.6-10). Aside from potential construction effects, this road would also be used for recreational purposes (and subject to seasonal closures if golden eagle nesting is identified nearby). Direct impacts on golden eagles would include potential disturbance to nests and the permanent loss of foraging habitat from the westside access road, marina, inundation area and dam footprint. Expansion of the Los Vaqueros Dam and other facilities would cause construction noise and related disturbances that could temporarily reduce available nesting and foraging habitat for golden eagles near the dam and along lower Kellogg Creek (below Los Vaqueros Dam).

Bald eagles may forage within the watershed, but currently do not nest in the watershed. The nearest record of nesting bald eagles is 15 to 20 miles away from the proposed reservoir expansion at Del Valle Reservoir; however, a few bald eagles have recently wintered within the watershed. Expansion of the reservoir could have both beneficial and short-term adverse effects on this species.

Beneficial effects include increased foraging opportunities due to a larger reservoir as well as increased shoreline. This increase could result in more bald eagles using the site for overwintering or initiating nesting in the watershed. Potential adverse impacts would include short-term loss of wintering and foraging habitat during construction, and loss of some roosting trees. The loss of roosting sites would be relatively minimal; however, the increased inundation area would result in the creation of more snags, thus creating new roosting habitat. Reservoir draining and refilling would directly impact habitat availability for bald eagles over a 3- to 4-year term.

Bald eagles do not nest or overwinter in the vicinity of any of the out-of-watershed facilities; therefore, construction of the new Delta Intake and Pump Station or pipelines are not expected to cause direct or indirect impacts to them. As such, the following sections do not include further detailed discussion on bald eagle impacts.

Swainson's hawks are infrequently observed in the Los Vaqueros Watershed. Nesting has not been documented in the watershed, which is at or beyond the western fringe of this species' nesting range. Because Swainson's hawk preferentially forages in Central Valley agricultural lands, the Los Vaqueros Watershed is considered to provide ancillary, and not primary, foraging habitat for this species. The inundation of grasslands habitat under Alternative 1 would cause the loss of this ancillary Swainson's hawk foraging habitat, but such loss is not expected to reduce the availability of resources for this species or affect their distribution. As a result, in-watershed activities are not expected to impact Swainson's hawk populations.

### New Delta Intake and Pump Station

Due to a lack of nesting and foraging habitat, golden eagles are not expected to occur near the new Delta Intake and Pump Station.

Swainson's hawks are not known to breed near the new Delta Intake and Pump Station site. Due to ongoing agricultural disturbances and a lack of breeding sites, this species is not expected to forage or breed near the proposed new facilities.

### Delta-Transfer Pipeline

Golden eagles are unlikely to occur near the Delta-Transfer Pipeline alignment because of the lack of breeding and foraging habitat along the alignment. The nearest record of breeding golden eagles is in the watershed, about 1.8 miles west of this alignment. No direct or indirect impacts on golden eagle are expected as a result of Delta-Transfer Pipeline construction (see Figure 4.6-10).

Swainson's hawks are known to breed in the pipeline alignment vicinity and could forage and breed within the study area. One nest is documented within 500 feet of the pipeline alignment (see Figure 4.6-9). No other nests are reported within 0.5 mile of the alignment (CDFG, 2008). Permanent upland disturbances associated with the Delta-Transfer Pipeline would be limited to small access vaults (about 100 square feet or 0.002 acre) about every 1,000 feet along the pipeline. Potential temporary impacts would include upland habitat disturbance within the 200-foot-wide construction corridor, and construction disturbance to nests within 0.5 mile of construction. Construction of this pipeline could affect potential Swainson's hawk foraging habitat and active breeding sites if any hawks are present within 500 feet.

### Transfer-LV Pipeline

Golden eagles are known to breed near the Transfer-LV Pipeline alignment, which is mostly within the watershed. Three records of breeding golden eagles are within 1 mile of the pipeline alignment; the nearest record is 0.2 mile away. Potential direct impacts on golden eagles include the temporary disturbance of foraging habitat during construction. Indirect impacts would include temporary disturbance to nesting or foraging golden eagles.

Swainson's hawk nests have been recorded within 0.5 mile of the alignment and no active farmlands fall within the alignment. If hawks or their nests are present, temporary impacts could include disturbance of upland habitat within the 200-foot-wide construction corridor and construction disturbances within 0.5 mile of nests. As these project facilities are generally in the

Diablo Range foothills, in an area that is not cultivated, with few Swainson's hawks noted from this area, a low likelihood exists that pipeline construction would affect nesting and foraging habitat.

### Transfer-Bethany Pipeline

Golden eagles are not known to breed within the immediate vicinity of the Transfer-Bethany Pipeline alignment, with few available nesting sites in the alignment. The nearest record of breeding golden eagles is 1.7 miles from the proposed alignment. Potential direct impacts on golden eagles associated with the Transfer-Bethany Pipeline would be limited to temporary disturbances to foraging habitat during construction.

Swainson's hawks are not known to breed near this pipeline alignment. No nests have been recorded within 0.5 mile of the alignment, and potential nesting habitat is considered minimal. Temporary impacts would include disturbance of upland habitat and potential disturbance to nests, if present. Because pipeline facilities are generally in the Diablo Range foothills, in an area that is not cultivated, with few Swainson's hawks noted from this area, a low likelihood exists that pipeline construction would affect nesting and foraging habitat.

### Expanded Transfer Facility

Golden eagles are not known to breed near the Expanded Transfer Facility site, which supports annual grassland habitat and ruderal[9] habitat. The nearest golden eagle record is 1.6 miles away, within the watershed. Golden eagles in the watershed are unlikely to forage in the tall non-native forbs that dominate the Expanded Transfer Facility site.

Swainson's hawks are not known to nest near the Expanded Transfer Facility site and the fenced site supports tall herbaceous vegetation that is considered poor Swainson's hawk foraging habitat. Nests have not been recorded within 0.5 mile of the facility, and the site and adjacent areas lack nesting sites.

### Power Supply Infrastructure (Power Options 1 and 2)

Swainson's hawk nesting habitat does not occur on the Western powerline alignment. Swainson's hawks have not been identified at the PG&E substation or within the powerline alignment, and foraging is not expected in this isolated non-agricultural area.

No impacts are anticipated to golden eagles or bald eagles from these proposed power facilities.

### Existing Mitigation Commitments

No existing mitigation commitments for the Swainson's hawk, golden eagle, or bald eagle would be affected by the project. CCWD has monitoring commitments for golden eagles and bald eagles from the EIR/EIS for the Los Vaqueros Reservoir and USFWS BO.

9 Ruderal habitat refers to disturbed areas that support low quality vegetation assemblages.

### Summary for Alternative 1

The construction phase of Alternative 1 would disturb foraging areas for the golden eagle, bald eagle, and Swainson's hawk, and could destroy or disrupt golden eagle and Swainson's hawk nests. Loss of golden eagle foraging habitat in the footprint of the westside access road, reservoir inundation area, Marina Complex, and dam; and small foraging habitat losses to Swainson's hawk along the Delta-Transfer Pipeline from permanent above-ground features would occur. Adverse impacts during operations include potential disturbance of a golden eagle nesting site from use of the new westside access road. The impact to nesting golden eagles and Swainson's hawks is significant and would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.9a. During project operations, bald eagle foraging could benefit from the increased inundation area of the expanded Los Vaqueros Reservoir; however, foraging impacts to golden eagle and Swainson's hawk would be significant prior to mitigation. CALFED and CDFG compensation guidelines would apply to offset impacts to golden eagle and Swainson's hawk foraging habitat, as described in Mitigation Measure 4.6.9b.

## *Alternative 2*

Potential impacts to populations of golden eagle, bald eagle, and Swainson's hawk, and their habitat under Alternative 2 would be the same as those discussed for Alternative 1. Alternative 2 would have significant direct and indirect impacts on golden eagle and Swainson's hawk before mitigation. With implementation of Mitigation Measures 4.6.9a (for each species) and 4.6.9b (for golden eagle and Swainson's hawk), impacts on these raptor species would be reduced to a less-than-significant level.

## *Alternative 3*

Potential impacts to populations of golden eagle, bald eagle, and Swainson's hawk and their habitat due to project implementation under Alternative 3 would be comparable to those discussed for Alternative 1. In the absence of the Transfer-Bethany Pipeline, this alternative would temporarily impact at least 150.9 fewer acres of grasslands habitat that could provide nesting and foraging opportunities for golden eagles and potentially Swainson's hawks.

Expansion of the Old River Intake and Pump Station would not require site modification or physical earthworks within the existing facility site. Expansion of this facility would not affect nesting sites for the above species. No impacts to golden eagle, bald eagle, or Swainson's hawk nests or foraging habitat are anticipated as a result of these activities.

Direct and indirect impacts to golden eagle, bald eagle and Swainson's hawk under Alternative 3 are considered significant prior to mitigation. The implementation of Mitigation Measures 4.6.9a (for each species) and 4.6.9b (for golden eagle and Swainson's hawk) would reduce impacts on these raptor species to a less-than-significant level.

### *Alternative 4*

Golden eagles are known to nest throughout the watershed, and the potential exists that they would be directly and/or indirectly impacted by project activities. Direct impacts include the loss of active or potential nest sites due to construction activities or reservoir inundation, and indirect effects may occur due to construction noise and equipment causing nest abandonment and mortality of young. The westside access road would not be realigned under this alternative; thus, direct impacts would largely be confined to the marina and dam footprint areas, and the 160-TAF borrow area. None of these areas have shown recent golden eagle nesting activity. Because of this, and the absence of the Transfer-LV Pipeline and Transfer-Bethany Pipeline facilities, project activities would be less likely to encounter nesting golden eagles compared with Alternative 1.

Bald eagles do not nest in the watershed. Potential impacts to bald eagles include short-term construction disturbance and loss of some roosting trees. In contrast to Alternative 1, bald eagle foraging habitat and roosting habitat would be available in the Los Vaqueros Watershed during construction under Alternative 4. Though the reservoir would have less water, the suitability of the watershed for bald eagles would not be substantially altered during the 3- to 4-year term of dam construction. The increased reservoir size could result in more bald eagles using the area for overwintering or initiating nesting in the watershed. Potential impacts include the potential loss of some roosting trees when the reservoir is filled, though this will be offset by the creation of new snags.

As described for Alternative 1, in-watershed activities are not expected to impact Swainson's hawk populations or the availability of foraging habitat.

Direct and indirect effects of Alternative 4 are considered significant prior to mitigation. Impacts under this alternative would be limited to the golden eagle, and would be reduced to a less-than-significant level with the implementation of Mitigation Measure 4.6.9a.

#### Mitigation Measures

Implementation of Mitigation Measures 4.6.9a (for all three species) and 4.6.9b (for golden eagle and Swainson's hawk) would reduce potential impacts associated with project construction to a less-than-significant level.

> **Measure 4.6.9a:** CCWD shall ensure that nesting golden eagles, bald eagles, and Swainson's hawks are protected. The following measures address potential impacts on nesting golden eagles and Swainson's hawks in the project vicinity. Measures that pertain to golden eagles and their nests would apply to nesting bald eagles, were they found in the Los Vaqueros Watershed prior to construction.
>
> - Whenever feasible, construction near recently active nest sites shall start outside the active nesting season. The nesting period for golden eagles is between March 1 and August 15. Bald eagles and Swainson's hawks nest between March 15 and August 15.
>
> - If groundbreaking activities begin during the nesting period, a qualified biologist shall perform a preconstruction survey 14 to 30 days before the start of each new

construction phase to search for golden eagle and Swainson's hawk nest sites within 0.5 mile of proposed activities. If active nests are not identified, no further action is required and construction may proceed. If active nests are identified, the avoidance guidelines identified below shall be implemented.

- For golden eagles, construction contractors shall observe CDFG avoidance guidelines, which stipulate a minimum 500-foot buffer zone around active golden eagle nests. Buffer zones shall remain until young have fledged. For activities conducted with agency approval within this buffer zone, a qualified biologist shall monitor construction activities and the eagle nest(s) to monitor eagle reactions to activities. If activities are deemed to have a negative effect on nesting eagles, the biologist shall immediately inform the construction manager that work should be halted, and CDFG will be consulted. The resource agencies do not issue take authorization for this species.

- If construction begins during the Swainson's hawk nesting period, a qualified biologist shall conduct preconstruction surveys at least 2 weeks prior to construction following CDFG guidance (e.g., CDFG, 2000) in areas that potentially provide nesting opportunities to verify species presence or absence. If the survey indicates presence of nesting Swainson's hawks within a 0.5-mile radius, the results shall be coordinated with CDFG to develop and implement suitable avoidance measures that include construction buffers and nest monitoring.

- Consistent with the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (CDFG, 1994), mitigation shall include the following approach:

  – No intensive new disturbances or other project-related activities that could cause nest abandonment or forced fledging shall be initiated within 0.25 mile (buffer zone) of an active nest between March 15 and September 15.

  – Nest trees shall not be removed unless no feasible avoidance exists. If a nest tree must be removed, CCWD shall obtain a management authorization (including conditions to offset the loss of the nest tree) from CDFG. The tree removal period specified in the management authorization is generally between October 1 and February 1.

  – Monitoring of the nest by a qualified biologist may be required if the project-related activity has the potential to adversely impact the nest.

- CDFG often allows construction activities that are initiated outside the nesting season to continue without cessation even if raptors such as golden eagles choose to nest within 500 feet of work activities. Thus, work at the dam construction site may continue without delay if surveys verify the local absence of nesting golden eagles, or if groundbreaking begins outside the nesting period (August 16 through February 28).

- After construction, CCWD shall survey for and monitor golden eagle and bald eagle nesting sites in the Los Vaqueros Watershed to ensure that recreational activity and other beneficial uses of the watershed do not disrupt eagle nest sites. Surveys will be performed at the beginning of the nesting season and continue through the nesting season. Consistent with present policy, recreational access and other disruptive activities will be suspended within 500 feet of active eagle nests until the young eagles have fledged.

**Measure 4.6.9b:** CCWD shall acquire and/or restore foraging habitat for Swainson's hawks and golden eagles in accordance with CALFED and CDFG guidelines, set forth in Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California (CDFG, 1994), as follows:

- Compensate for permanent foraging habitat losses (e.g., agricultural lands and annual grasslands) within 1 mile of active Swainson's hawk nests (acreage to be determined during preconstruction surveys) at a ratio of 1 acre of mitigation lands for each acre of permanent development (i.e., 1:1 replacement ratio). Foraging habitat impacts will be largely limited to valve structures (roughly 10-foot square) every few hundred feet along pipeline routes, with less than an acre of anticipated foraging habitat loss.

- Consistent with MSCS guidance, impacts to golden eagle foraging habitat will be provided by enhancing or restoring foraging habitat at ratio from ratio of 1:1 to 5:1.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.10: Project construction and increased reservoir water levels would result in temporary and permanent loss of potential and occupied habitat for the Alameda whipsnake. (Less than Significant with Mitigation)**

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

Upland scrub and nearby associated woodland and grassland habitats in the vicinity of the reservoir expansion area are assumed to support Alameda whipsnakes based on CNDDB records and survey findings (Swaim, pers. comm., 2007).

**Scrub Habitat.** Direct project impacts on scrub habitat that is suitable for the Alameda whipsnake includes 6.9 acres of permanent impacts and about 0.5 acres of temporary impacts. Areas that would be affected include the borrow area (3.8 acres), marina road (0.6 acre), dam (1.9 acre), and reservoir inundation footprint (0.6 acre). Assuming that some affected areas could be revegetated, scrub habitat would be temporarily affected at the marina road (0.3 acre), inundation footprint (0.2 acre), and westside access road (0.01 acre).

Though scrub habitat at the borrow site is generally isolated from larger scrub habitat blocks, the borrow area provides sufficient cover and vegetation complexity to support the Alameda whipsnake (Swaim, pers. comm., 2007). Also, this area is within the movement capabilities of the Alameda whipsnake relative to other occupied scrub habitat. Construction and use of construction-related vehicles could also cause Alameda whipsnake injury or mortality in scrub and nonscrub habitat, which would be a direct impact.

**Nonscrub Habitat.** In addition to direct effects caused by the loss of scrub habitat, direct habitat and species effects are expected in adjacent grasslands and oak woodlands. Generally, nonscrub habitat next to more typical "core" scrub habitat provides several important benefits and values

for Alameda whipsnakes. Annual grasslands and oak woodlands within several miles of scrub habitat may be routinely used by Alameda whipsnakes during normal foraging and dispersal activities (Swaim, pers. comm., 2007).

Alameda whipsnake movement observations demonstrate that individual dispersing snakes may venture into areas substantially greater than 1,000 feet from scrub habitat, out to 4 miles in some instances (Swaim, pers. comm., 2007). However, the MSCS compensation guidelines do not require compensation for permanent and temporary impacts to nonscrub habitat that may support Alameda whipsnake (CALFED, 2000). Because mitigation is not required for Alameda whipsnake nonscrub habitat under MSCS guidelines, the following analysis of 1,000- and 2,500-foot study buffers around scrub habitat is intended for informational purposes to identify the magnitude of the potential impact to potentially occupied nonscrub habitat, and is not intended to inform Alameda whipsnake mitigation requirements (see **Figure 4.6-26**).[10] **Table 4.6-16** presents the direct impacts on nonscrub upland habitat within 1,000 and 2,500 feet of identified scrub habitat.

**TABLE 4.6-16**
**DIRECT IMPACTS ON NONSCRUB HABITAT WITHIN 1,000/2,500 FEET OF ALAMEDA WHIPSNAKE "CORE" UPLAND SCRUB HABITAT**

| Habitat Type[1] | Alternatives 1, 2, and 3 Within 1,000/2,500 feet of Upland Scrub | Alternative 4 Within 1,000/2,500 feet of Upland Scrub |
|---|---|---|
| Annual grasslands | 102.2 acres/404.4 Acres | 23.6 acres/141.8 Acres |
| Oak woodlands | 33.8 acres/36.8 Acres | 2.0 acres/8.4 Acres |
| Riparian woodland | 5.93 acres/16.2 Acres | 3.2 acres/8.8 Acres |
| Total Impacts to Nonscrub Habitat | 141.9 acres/457.4 Acres | 28.8 acres/159.0 Acres |

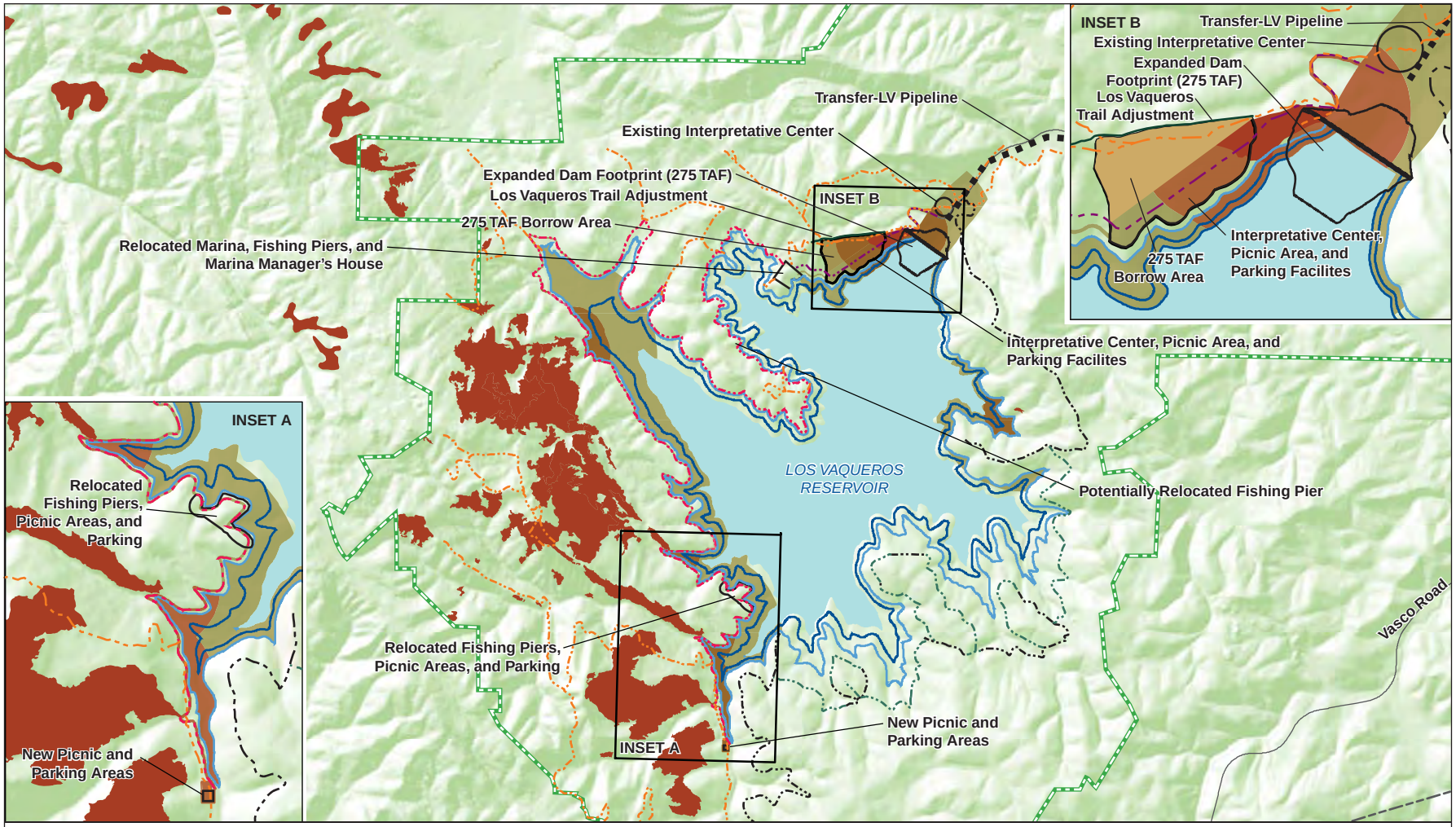
1 Does not include aquatic and emergent habitats, which presumably are not used by Alameda whipsnakes.

SOURCE: ESA unpublished data, 2006-2008

Indirect impacts from grading and other construction activities in scrub and nonscrub habitat could include whipsnake harassment due to noise or vibration.

Reservoir inundation and, in particular, the flooding of annual grasslands near Los Vaqueros Road on the southwestern edge of the reservoir, could indirectly affect the availability of nonscrub habitat for Alameda whipsnakes. Inundation would extend the waterline about 0.5 mile farther south along Los Vaqueros Road, thereby severing the connectivity between scrub habitats to the west of the road and annual grassland to the east. The grasslands areas east of Los Vaqueros Road that would be affected are more than 500 to 1,000 feet from scrub habitat. It is not known if Alameda whipsnakes regularly use annual grasslands habitats east of Los Vaqueros Road; however, such use is expected at least on an intermittent basis.

10 Note that the project does mitigate for grassland and woodlands that may support Alameda whipsnakes.




SOURCE: USGS, 1993 (base map); ECCHCP/NCCP, 2006; and ESA, 2007

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**Figure 4.6-26**

Potential Impacts to Alameda Whipsnake Habitat

### All Other Facilities (Outside the Watershed)

Alameda whipsnake habitat is not present within the study area of any other proposed facility on lands outside the watershed (i.e., new Delta Intake and Pump Station, Transfer Facility Expansion, Delta-Transfer Pipeline, Transfer-LV Pipeline [outside of the watershed], Transfer-Bethany Pipeline, and electrical transmission facilities). Therefore, no impacts would occur as a result of construction or operation of these facilities.

### Existing Mitigation Commitments

CCWD has no mitigation commitments for Alameda whipsnakes.

### Summary for Alternative 1

Under Alternative 1, the project would directly impact potential and occupied habitat for Alameda whipsnakes through the loss of scrub habitat at the borrow area, marina road, dam, and reservoir footprint; as well as habitat in adjacent oak and riparian woodlands and annual grasslands. Under this alternative, 6.9 acres of scrub would be impacted and 102.2 acres of grasslands would be affected within 1,000 feet of scrub habitat. Impacts related to Alternative 1 would be significant prior to mitigation. Alternative 1-related impacts would be reduced to a less-than-significant level through implementation of Mitigation Measure 4.6.10a, which provides for project-area Alameda whipsnake studies, protection measures during construction, an appropriate revegetation plan, and compensatory habitat creation/restoration within the project area; and Mitigation Measure 4.6.10b, which provides for compensation of permanent habitat losses through the acquisition, protection, and management of occupied scrub habitat.

## *Alternative 2*

Potential impacts to populations of Alameda whipsnakes and their habitat due to project implementation under Alternative 2 would be the same as those discussed for Alternative 1. Impacts would be significant before mitigation. The implementation of Mitigation Measure 4.6.10a and 4.6.10b would reduce this impact to a less-than-significant level.

## *Alternative 3*

Potential impacts to populations of Alameda whipsnakes and their habitat due to project implementation under Alternative 3 would be the same as those discussed for Alternative 1. Because all impacts to Alameda whipsnakes would occur in association with the dam raise, reservoir inundation, and Recreation Facilities (as detailed in Alternative 1), Alternative 3 would be identical to those discussed previously. Project impacts are considered significant prior to mitigation. The implementation of Mitigation Measure 4.6.10a and 4.6.10b would reduce this impact to a less-than-significant level.

## *Alternative 4*

Under Alternative 4, permanent direct impacts on Alameda whipsnake upland scrub habitat are estimated at 6.4 acres (versus 6.9 acres under Alternative 1) and temporary impacts would be

about 0.4 acre (0.5 acre was identified for Alternative 1). Permanent impacts include habitat loss at the borrow area (3.8 acres), marina road (0.6 acre), dam (1.9 acre), and the 160-TAF inundation footprint (0.1 acre). Temporary impacts would arise from the marina road (0.3 acre) and westside access road (0.01 acre).

Impacts to nonscrub habitat that may be used by Alameda whipsnakes would be substantially less under Alternative 4 than under Alternative 1 (Figure 4.6-26; Table 4.6-16). Within 1,000 feet of scrub habitat, Alternative 4 would impact 23.6 acres of annual grasslands (versus 102.2 acres under Alternative 1), 2.0 acres of oak woodlands (versus 33.8 acres), and 3.2 acres of riparian habitat (versus 5.9 acres). Within 2,500 feet of scrub habitat, Alternative 4 would impact 141.8 acres of annual grasslands (versus 404.4 acres under Alternative 1), 8.4 acres of oak woodlands (versus 36.8 acres), and 8.8 acres of riparian woodland (versus 16.2 acres). Under Alternative 4, direct impacts to non-scrub habitat that may be used by Alameda whipsnakes are less than half of those anticipated under Alternative 1.

These impacts are considered significant before mitigation. The implementation of Mitigation Measure 4.6.10a, which provides a mitigation and monitoring strategy to avoid and minimize Alameda whipsnake impacts before and during construction, and provide habitat restoration after construction, and Mitigation Measure 4.6.10b, to compensate for habitat losses consistent with MSCS guidelines, would reduce impacts on this species to a less-than-significant level.

### Mitigation Measures

**Measure 4.6.10a:** CCWD shall minimize and/or avoid construction-related impacts on Alameda whipsnakes through the development and implementation of an Alameda whipsnake protection and monitoring plan. USFWS shall approve this plan during formal consultation under FESA Section 7, and shall establish a program of preconstruction surveys and construction supervision to identify and prevent potential hazards to individual Alameda whipsnakes that could be present during construction. The plan shall prohibit or restrict activities that could harm or harass this species. Habitat restoration and compensation shall also be included in the plan. Measures in this plan shall include, but are not limited to, the following:

- A description of the species habitat requirements and movement patterns applicable to the project area.

- A procedure for conducting preconstruction surveys and/or trapping surveys before the onset of initial ground-disturbing activities in areas with high quality habitat, as well as monitoring to be conducted before construction and/or restoration begin each day that these activities shall occur.

- Direct monitoring by a qualified biologist of the clearing of occupied or potentially occupied coastal scrub in the project area that would be directly affected by project construction (not by inundation). Construction shall not proceed until areas have been surveyed to capture and relocate as many Alameda whipsnakes as reasonably possible to minimize take. However, some individuals may be undetected or move in following surveys and would be subject to take.

- A protocol for the selection of USFWS-approved biological monitors who have experience with Alameda whipsnakes to monitor construction activities (such as initial clearing and grading, excavation, and the installation of silt fencing) within and next to Alameda whipsnake habitat.

- Worker education materials and procedures for informing construction crews about the potential presence of Alameda whipsnakes, equipment operation procedures to minimize impacts to whipsnakes, responsibilities of project personnel (such as reporting observations of Alameda whipsnakes within or next to the construction area to the biological monitor), observing speed limits, avoiding use of the haul road until cleared by the biological monitor, and other measures to avoid mortality of whipsnakes during construction; and the role of the monitoring staff in advising construction crews of compliance with take-avoidance measures for Alameda whipsnakes, documenting compliance in monitoring reports, and notifying USFWS within 24 hours of observation of whipsnakes within or next to a construction area.

- Limit stockpiling and staging activities and vehicle and equipment refueling and maintenance to occur in nonsensitive areas.

- CCWD shall prepare and implement a revegetation plan that describes pre-project conditions and available habitats for Alameda whipsnakes, invasive species control measures, and restoration and monitoring success criteria for undeveloped areas disturbed during project construction. The plan will provide the basis for the reestablishment of scrub habitat in disturbed areas and mitigation sites, and will include at a minimum an identification of mitigation areas, site preparation requirements, specifications for planting and/or seeding (e.g., what species and how many plantings), seasonal considerations for planting and site maintenance, the proposed irrigation strategy, performance criteria (e.g., 70 percent survival of plantings 5 years following installation, and 70 percent of plants exhibiting fair or better condition), any contingency measures that may be anticipated, and a provision for semi-annual monitoring and reporting.

**Measure 4.6.10b:** Consistent with MSCS guidelines, CCWD shall provide compensation for permanent and temporary loss of upland scrub habitat that may support Alameda whipsnakes by either (1) compensating for permanent habitat losses by acquiring, protecting, and managing 2 to 5 acres of existing occupied habitat for every acre within the same area of occupied habitat that would be affected, and/or (2) enhancing or restoring 2 to 5 acres of suitable habitat near the affected areas for every acre of occupied habitat affected (CALFED, 2000).

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.11: Project construction activities could result in direct and indirect impacts on the valley elderberry longhorn beetle and its habitat. (Less than Significant with Mitigation)**

The impact assessment for the valley elderberry longhorn beetle relied on elderberry shrub surveys within the watershed (ESA, 2005) and facilities outside the watershed in 2007 and 2008.

## *Alternative 1*

### Los Vaqueros Reservoir Expansion, In-watershed Facilities, and Recreational Facilities

In the watershed, the valley elderberry longhorn beetle was documented to occur in several drainages within the proposed inundation area. A total of 85 elderberry shrubs were documented within the watershed during surveys in 2005 (ESA, 2005). USFWS considers that direct or indirect impacts could occur to elderberry shrubs (with stems greater than 1 inch in diameter) within 100 feet of project construction sites (USFWS, 1999c).

The reservoir inundation area supports 45 elderberry shrubs with 249 stems measuring larger than 1 inch in diameter (ESA, 2005). Of these, six shrubs exhibited valley elderberry longhorn beetle exit holes. The inundation of these shrubs could cause direct mortality to beetles and loss of potential and occupied habitat. USFWS guidance indicates that indirect impacts could occur to two elderberry shrubs between 20 and 100 feet from the inundation zone. Indirect impacts could include general habitat degradation and loss of community complexity due to the loss of associated non-elderberry vegetation, general disturbance near occupied habitat, and possibly the accumulation of construction-generated dust on leaves.

The Inlet/Outlet Pipelines study area supports 10 elderberry shrubs with 53 stems greater than 1 inch in diameter (ESA, 2005). Within the project area, no shrubs are within 20 feet of the pipeline footprint, and it is expected that no shrubs would be removed.

### Transfer-LV Pipeline

As described for the in-watershed facilities, four elderberry shrubs are within 100 feet of the Transfer-LV Pipeline construction corridor. Of these shrubs, three are more than 75 feet from the near the Inlet/Outlet Pipelines project area. Another elderberry shrub is within 20 feet of the pipeline construction footprint on Kellogg Creek (CDFG, 2008), but not within the pipeline footprint. Therefore, direct impacts (i.e., loss) on valley elderberry longhorn beetles would be limited to one plant, and indirect effects, mainly the potential accumulation of dust on leaves, could occur to three plants.

### New Delta Intake and Pump Station, Delta-Transfer Pipeline, Expanded Transfer Facility, Transfer-Bethany Pipeline

Habitat for valley elderberry longhorn beetle is not present in the study areas for the new Delta Intake and Pump Station, Delta-Transfer Pipeline, Expanded Transfer Facility, and Expanded Transfer Facility; therefore, no impacts are expected in these project areas.

### Power Supply Infrastructure (Power Options 1 and 2)

Elderberry shrubs do not occur near any of the proposed power facilities under either option; thus, no impacts are anticipated to valley elderberry longhorn beetles.

### Summary for Alternative 1

Under Alternative 1, potential impacts to valley elderberry longhorn beetles and their habitat are anticipated for in-watershed work and for the Transfer-LV Pipeline. Reservoir inundation to 275-TAF level would directly impact 45 shrubs, and the dam raise and appurtenant facilities in the Inlet/Outlet Pipelines construction area would affect an additional 10 shrubs. One shrub would be directly affected by the Transfer-LV Pipeline. An additional 41 shrubs may be indirectly impacted by accumulation of dust on leaves. This is considered a potentially significant impact prior to mitigation. The implementation of Mitigation Measure 4.6.11 would reduce impacts to a less-than-significant level.

## *Alternative 2*

Potential impacts to valley elderberry longhorn beetle and their habitat due to project implementation under Alternative 2 would be the same as those discussed for Alternative 1, and would be significant before mitigation. The implementation of Mitigation Measure 4.6.11 would reduce impacts to a less-than-significant level.

## *Alternative 3*

Potential impacts to valley elderberry longhorn beetle and their habitat under Alternative 3 are the same as those for Alternative 1, affecting the same individual elderberry plants by the same mechanisms. These impacts would be significant before mitigation. The implementation of Mitigation Measure 4.6.11 would reduce impacts to a less-than-significant level.

## *Alternative 4*

The 160-TAF inundation zone supports 16 elderberry shrubs, with 74 stems measuring larger than 1 inch in diameter. Of these, two shrubs exhibited valley elderberry longhorn beetle exit holes (ESA, 2005). The inundation of these shrubs could cause direct mortality to beetles and loss of potential and occupied habitat. Elderberry shrubs are not present in the 160-TAF borrow area. Alternative 4 would affect 29 fewer elderberry shrubs than Alternative 1, with similar and indirect dust accumulation effects on vegetation. This would be a lesser, though significant impact prior to mitigation. The implementation of Mitigation Measure 4.6.11 would reduce impacts to a less-than-significant level.

### Mitigation Measures

The following measure is based on the Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS, 1999c).

> **Measure 4.6.11:** CCWD shall implement USFWS guidelines (1999 or more current) for avoiding, minimizing, and mitigating project impacts on valley elderberry longhorn beetles. If avoidance is not feasible, USFWS general compensation guidelines call for replacement of elderberry plants in designated mitigation areas at a ratio from 2:1 to 5:1 for each stem greater than 1 inch in diameter. Note that replacement ratios are by stem and not by elderberry shrub. Replacement stock shall be obtained from local sources. Plants are generally replaced at a 2:1 ratio for stems greater than 1 inch in diameter at ground level with no

adult emergence holes, 3:1 for stems where emergence holes are evident in less than 50 percent of the shrubs, and 5:1 for stems greater than 1 inch in diameter with emergence holes.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.12: Project construction activities could affect active breeding bird nest sites and new powerlines could affect migratory birds (Less than Significant with Mitigation)**

### *All Project Alternatives*

**Loss of Active Nests.** Each of the proposed alternatives would cause some degree of temporary habitat disturbance or permanent habitat loss within or near potential nesting habitat for birds that are protected under the federal MBTA. A subset of bird species that nest or could nest in the project vicinity includes the following: Cooper's hawk, sharp-shinned hawk (*A. striatus*), red-tailed hawk, red-shouldered hawk (*B. lineatus*), white-tailed kite, osprey (*Pandion haliaetus*), northern harrier, golden eagle, prairie falcon (*Falco mexicanus*), and other raptors, as well as Bell's sage sparrow (*Amphispiza belli* ssp. *belli*), oak titmouse (*Baeolophus inornatas*), yellow warbler (*Dendroica petechia*), Pacific-slope flycatcher (*Empidonax difficilis*), California horned lark (*Eremophila alpestris actia*), yellow-breasted chat (*Icteria virens*), loggerhead shrike, Allen's hummingbird (*Selasphorus sasin*), Bewick's wren (*Thryomanes bewickii*), California thrasher, and tricolored blackbird. These and other more common bird species may forage and nest in riparian, woodland, scrub, and/or grassland habitats throughout the project area. Nesting sites for shorebird and waterfowl species are similarly protected.

Construction activities associated with the project alternatives (including grading and removal of trees, shrubs, and other potential nesting habitat during the breeding season) could result in direct mortality of nesting birds. Indirect impacts from construction noise, vibrations, and increased human presence could spook adult birds, causing nest abandonment, death of young, or loss of reproductive potential at active nests near project sites. Such project impacts could occur at all facilities associated with the project alternatives.

**Impacts of Lighting on Birds.** Project alternatives would incorporate relatively low-height, high-intensity lighting during construction, and low-height, low intensity lighting at onsite buildings and facilities after construction. After construction, project lighting would be consistent with existing lighting at the dam and other facilities, which have not been demonstrated to pose a significant impact to flying birds, including shorebirds, waterfowl, passerines, and raptors that occur locally. Consistent with existing lighting in the watershed, light sources would be shielded and directed downward to reduce the amount of light and ambient glare. As a result, outdoor lighting for the project alternatives is not expected to result in a significant impact to wildlife or pose an increased strike hazard to migratory or other flying birds. After construction, shorebirds, waterfowl, passerines, and raptors are expected to use habitats in the project area to the same degree as before the project.

**Impacts of Noise and Vibration Effects on Nesting Birds.** Generally, more intensive construction activities can impact breeding birds within a larger sphere of influence. This is particularly true for pile driving, jack-hammering, and blasting activities, which may have a short duration, but can be loud and potentially disruptive to local nesting birds. Noise or vibration impacts on nesting golden eagles and other raptors could occur during blasting or jack-hammering activities in the 275-TAF borrow area and at the dam construction site.

**Loss of Habitat.** Construction disturbances to native habitats that may support nesting birds along pipeline and power alignments would be temporary with no permanent habitat losses. Project construction and reservoir inundation would result in the permanent removal of grassland, scrub, woodland, and riparian habitats that could support breeding birds. However, this impact area represents a small portion of the available nesting, foraging, and wintering habitat for special-status birds in the regional project vicinity.

**Conflicts with Powerlines.** Alternatives 1, 2, and 3 include the construction of new powerlines by either PG&E or Western that will connect new or upgraded facilities to existing power supplies. Poles and powerlines also pose a danger to raptors as a result of electrocution and collision hazards, and are a recognized source of raptor mortality. Powerline electrocution is the result of two interacting factors: raptor behavior and pole design. Raptors are opportunistically attracted to powerlines because they provide perch sites for hunting, resting, feeding, for territorial defense, or as nesting structures. Many standard designs of electrical industry hardware place conductors and groundwires close enough together that raptors can touch them simultaneously with their wings or other body parts, causing electrocution. Raptors and other birds may also collide with powerlines, which can be difficult for birds to detect for various reasons such as inclement weather conditions. Western typically uses standard hardware that minimizes the potential for bird electrocutions and collisions.

### Summary

Temporary habitat disturbance or permanent habitat loss within or near potential nesting habitat for birds that are protected under the federal MBTA is possible under all project alternatives, with no single alternative markedly different from the others when considering these individual avian species as a collective group. This impact is significant before mitigation.

For all project alternatives, the implementation of Measure 4.6.12a and 4.6.12c will ensure that during the nesting season pre-construction surveys will be conducted and any active nests will be adequately buffered. For Alternatives 1, 2, and 3, Mitigation Measure 4.6.12b will reduce the potential for bird electrocution at new powerlines. Implementation of these mitigation measures would reduce impacts to a less-than-significant level.

### Mitigation Measures

> **Measure 4.6.12a:** CCWD shall ensure that active nests of raptors and other special-status nesting birds are not disturbed during construction.

If active construction work (i.e., ground clearing and grading, including removal of trees or shrubs) is scheduled to take place during the nonbreeding season (September 1 through January 31), no mitigation is required. If such construction activities are scheduled during the breeding season (February 1 through August 31), the following measures shall be implemented to avoid impacts on nesting raptors and other protected birds:

- Within 30 days of construction, a qualified wildlife biologist shall conduct preconstruction surveys of all potential nesting habitat within 500 feet of construction sites where access is available.

- If active nests are found during preconstruction surveys, a no-disturbance buffer (acceptable in size to CDFG) shall be created around active raptor nests and nests of other special-status birds during the breeding season, or until it is determined that all young have fledged. Typical buffers include 500 feet for raptors and 250 feet for other nesting birds (e.g., shorebirds, waterfowl, and passerine birds). The size of these buffer zones and types of construction activities restricted in these areas could be further modified during construction in coordination with CDFG and shall be based on existing noise and human disturbance levels in the project area.

- If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation shall be required. Trees and shrubs within the construction footprint determined to be unoccupied by special-status birds, or that are outside the no-disturbance buffer for active nests, could be removed.

- If construction commences during the nonbreeding season and continues into the breeding season, most songbirds that choose to nest next to active construction sites are generally considered to acclimate to construction activities, though nest abandonment may occur in some instances. However, nesting site monitoring shall be conducted by CCWD and no-disturbance buffer zones established in coordination with CDFG around active nests to prevent impacts on nesting birds and their young.

**Measure 4.6.12b:** CCWD shall follow Avian Protection Plan guidelines for powerlines.

CCWD shall use state-of-the-art guidelines to reduce raptor mortality from interactions with powerlines. The Avian Power Line Interaction Committee (1994) and USFWS recommend the following:

- Provide 60-inch minimum horizontal separation between energized conductors or energized conductors and grounded hardware,

- Insulate hardware or conductors against simultaneous contact if adequate spacing is not possible,

- Use Western-approved poles that minimize impacts to birds, and,

- Increase the visibility of conductors or shield wires to prevent and minimize bird collisions.

**Measure 4.6.12c:** Measures to reduce noise and vibration impact on nesting raptors near the dam and 275-TAF borrow area.

As identified in Measure 4.6.12a, a qualified biologist will conduct preconstruction surveys and establish suitable avoidance buffers around active bird nests. Construction at the 275-TAF borrow area will begin either outside the active nesting season or after verification that breeding birds are absent within 500 feet of work areas. If it appears that noise or vibration from ongoing blasting or jack-hammering at the dam or 275-TAF borrow area could affect nesting raptors that arrive after the start of construction, specific measures shall be implemented to reduce noise levels.

During blasting or jack-hammering, a noise level of no greater than 85 decibels (measured at the nest) will be used as general guidance for raptor nests that are established after construction. This parameter may be met through a variety of standard noise-reducing procedures for construction equipment, including the use of noise dissipaters and blasting mats. Contract specifications will include requirements for the use of blasting methods, including qualifications for the blasting contractor, the use of noise control methods and threshold noise levels, and other limitations. The specifications will also require the submittal of a blasting plan by the contractor that will cover the proposed noise control techniques, blasting charge size and limits, and hours of blasting.

**Impact Significance after Mitigation:** Less than Significant.

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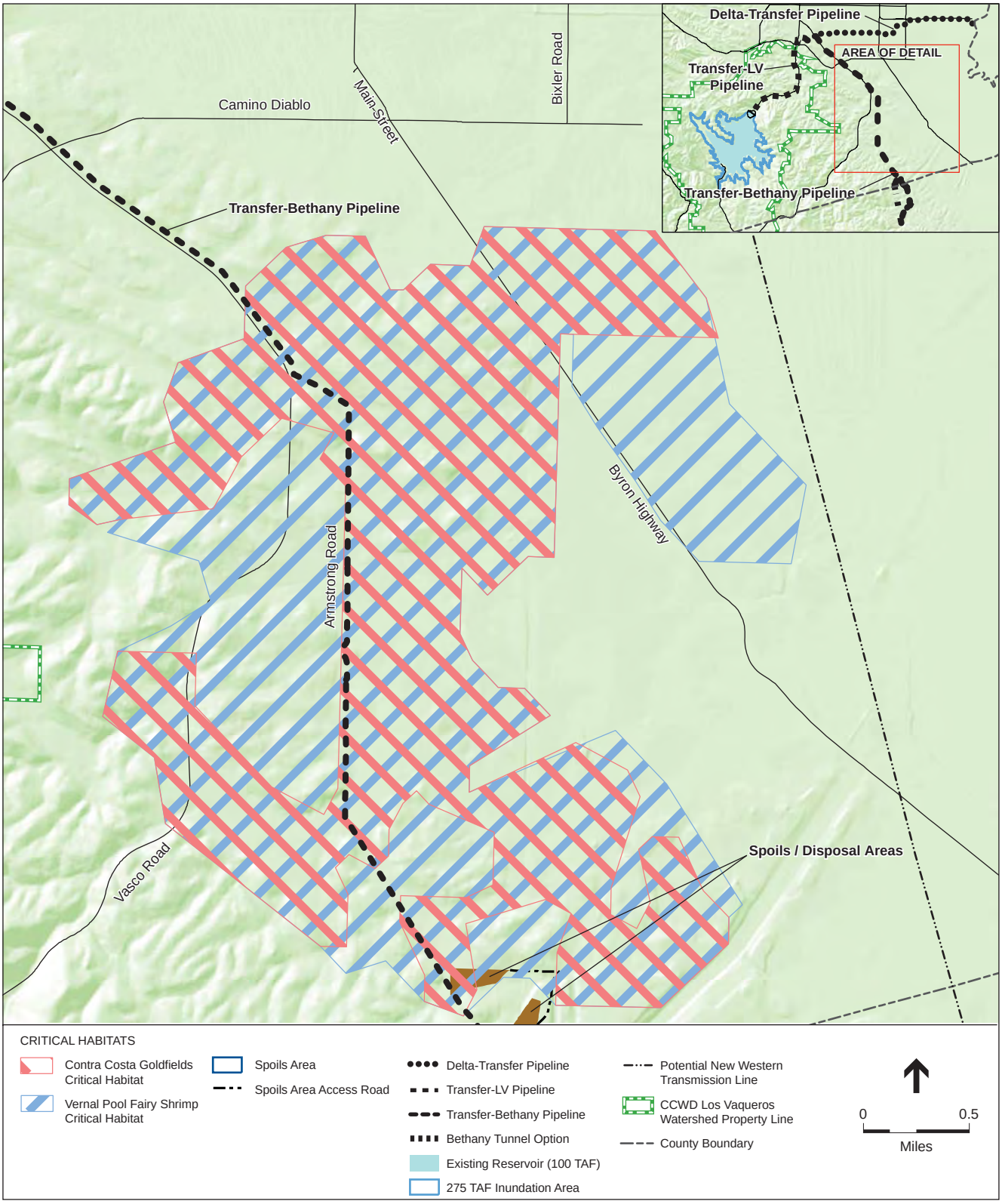
**Impact 4.6.13: Project construction activities under Alternatives 1 and 2 could affect designated critical habitat for listed species (vernal pool fairy shrimp and Contra Costa goldfields). (Less than Significant with Mitigation for Alternatives 1 and 2; No Impact for Alternatives 3 and 4)**

### *Alternative 1*

The Expanded Los Vaqueros Reservoir, Recreational Facilities, Expanded Transfer Facility, Delta-Transfer Pipeline, Transfer-LV Pipeline, Expanded Old River Intake and Pump Station, and new Delta Intake and Pump Station are not within designated critical habitat; therefore, no impacts would occur from these project components.

#### Transfer-Bethany Pipeline

As identified in the USFWS Vernal Pool Recovery Plan, a portion of the Transfer-Bethany Pipeline alignment is within the Altamont Hills core area of the Livermore vernal pool region (USFWS, 2005a). The purpose of the plan is to incorporate ecosystem considerations through the development and implementation of recovery measures for communities or ecosystems where federally listed species occur, in a manner that restores, reconstructs, or rehabilitates the structure, distribution, connectivity, and function upon which those listed species depend (USFWS, 2005a). This portion of the alignment has been designated by USFWS as critical habitat for Contra Costa goldfields and vernal pool fairy shrimp (USFWS, 2003; 2006) (see **Figure 4.6-27**).




SOURCE: USGS, 1993 (base map); ESRI, 2006; CCWD, 2007; CCC, 2007; MWH, 2007; and ESA, 2007

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**Figure 4.6-27**

Critical Habitat for Contra Costa Goldfields and Vernal Pool Fairy Shrimp

Construction of the Transfer-Bethany Pipeline would directly affect designated critical habitat for Contra Costa goldfields and vernal pool fairy shrimp. About 4.0 miles (145.4 acres[11]) of the proposed pipeline alignment passes through designated critical habitat for vernal pool fairy shrimp and 2.7 miles (98.1 acres) of the alignment passes through designated critical habitat for Contra Costa goldfields.

Contra Costa goldfields are not present in this pipeline project area and are not historically described from the Byron Hot Springs critical habitat unit (USFWS, 2005a; CDFG, 2008). Focused presence/absence surveys failed to identify Contra Costa goldfields in the study area.

Focused surveys in winter 2008 identified 16 vernal pools within or next to the Transfer-Bethany Pipeline alignment that could support vernal pool fairy shrimp. This species was identified from four of these pools, and non-listed fairy shrimp species (versatile fairy shrimp [*Branchinecta lindahli*] and alkali fairy shrimp [*B. Mackini*]) were collected from six others (ESA, 2008b). Vernal pool fairy shrimp are presumed present in all 16 pools based on the presence of suitable habitat.

The critical habitat designation for vernal pool fairy shrimp and Contra Costa goldfields was finalized in 2003 and revised in 2006. The PCEs for these species identified in the Regulatory Setting section of this chapter (i.e., the physical and biological functions that are considered essential to species conservation and require special management considerations or protection) include habitat in the form of vernal pools, swales, or other wetlands features, and the geographic, topographic, and edaphic features that comprise pool complexes. Such conditions are present in portions of the Transfer-Bethany Pipeline alignment. Any proposed activities within designated critical habitat that would alter the physical makeup of pools or reduce the functionality of the larger vernal pool complex would constitute a significant project effect.

Potential indirect effects to vernal pool hydrology in the local vicinity of the Transfer-Bethany Pipeline alignment in Altamont Hills core area of the Livermore vernal pool region are discussed above in Measure 4.6.6.

### Summary

Specific impacts within designated critical habitat for vernal pool fairy shrimp and Contra Costa goldfields are characterized in Impact 4.6.6 as the loss of four occupied vernal pool fairy shrimp pools and 12 potentially occupied pools within critical habitat for vernal pool species. Beyond these losses, with the implementation of measures to stockpile claypan materials for use in later reestablishment of surface compaction and contours, the project is not expected to adversely modify designated critical habitat for vernal pool fairy shrimp and Contra Costa goldfields. Impacts related to Alternative 1 are significant prior to mitigation but can be mitigated to a less-than-significant level through the implementation of Mitigation Measures 4.6.2a and 4.6.2b (wetland protection and compensation measures), and Mitigation Measures 4.6.6a and 4.6.6b (vernal pool fairy shrimp protection and habitat compensation measures).

[11] Acreage assumes a 300-foot-wide construction corridor, which can be constricted within sensitive areas.

### *Alternative 2*

Potential impacts to designated critical habitat under Alternative 2 would be the same as those discussed for Alternative 1, as they both include the Transfer-Bethany Pipeline. This constitutes a significant impact before mitigation. The impact on designated critical habitat from Transfer-Bethany Pipeline construction would be less than significant after the implementation of Mitigation Measures 4.6.2a and 4.6.2b and Mitigation Measures 4.6.6a and 4.6.6b.

### *Alternative 3*

The proposed alternative would have no impact to designated critical habitat because it does not include the Transfer-Bethany Pipeline. No mitigation is required.

### *Alternative 4*

The proposed alternative would have no impact to designated critical habitat because it does not include the Transfer-Bethany Pipeline. No mitigation is required.

**Mitigation:** None required. See Measures 4.6.2a, 4.6.2b, 4.6.6a and 4.6.6b.

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**Impact 4.6.14: Project construction activities could affect nonlisted special-status reptile species (San Joaquin coachwhip and coast horned lizard). (Less than Significant with Mitigation)**

### *Alternative 1*

Based on large scale range maps, San Joaquin coachwhips and coast horned lizards (*Phrynosoma coronatum blainvillii*) are expected to occur sporadically throughout the regional project vicinity in open, dry areas with little or no tree cover. Documented occurrences of both are patchy, with one documented occurrence of San Joaquin coachwhip in the footprint of the Los Vaqueros Reservoir Dam. No other occurrences are reported in the Los Vaqueros Watershed or near any other project facilities. Coast horned lizard similarly has few reported local occurrences, but may be encountered in the project area. Both species are relatively uncommon and difficult to detect, even when present. All project alternatives would likely result in direct mortality of these species as well as temporary and permanent loss of their habitat.

Impacts to these species include the potential for their destruction by equipment or entrenchment in open trenches or other project facilities. This constitutes a significant impact before mitigation. The Implementation of Mitigation Measure 4.6.14, which minimizes the project footprint within suitable habitat and provides for preconstruction surveys, would reduce impacts on these species from project construction to a less-than-significant level.

### *Alternative 2*

Potential impacts to populations of San Joaquin coachwhips and coast horned lizards and their habitat under Alternative 2 would be the same as those discussed for Alternative 1. This

constitutes a significant impact before mitigation. Implementation of Mitigation Measure 4.6.14 would reduce impacts on these species from project construction to a less-than-significant level.

### *Alternative 3*

Potential impacts to populations of San Joaquin coachwhip and coast horned lizard and their habitat due to project implementation under Alternative 3 would be less than under Alternative 1 because Alternative 3 would not affect suitable annual grasslands on the Transfer-Bethany Pipeline that presumably support these species. In total, Alternative 3 would affect at least 150.9 fewer acres of grasslands habitat that could support the San Joaquin coachwhip and coast horned lizard. Project impacts under Alternative 3 would be considered significant before mitigation. Implementation of Mitigation Measure 4.6.14 would reduce impacts on these species from project construction to a less-than-significant level.

### *Alternative 4*

Potential impacts to San Joaquin coachwhips and coast horned lizards would be considerably smaller under Alternative 4 compared with Alternative 1, because impacts would be limited to areas within the Los Vaqueros Watershed. This alternative would affect less habitat for these species within the watershed: 498.5 acres of annual grasslands within the watershed (versus 976.2 acres under Alternative 1) and would not incur the temporary impacts totaling 252.6 acres from the Delta-Transfer Pipeline (24.0 acres), Transfer-LV Pipeline (76.5 acres), Transfer-Bethany Pipeline (150.9 acres), and Expanded Transfer Facility (1.2 acres).

Even so, impacts to San Joaquin coachwhip and coast horned lizard would be significant prior to mitigation. Implementation of Mitigation Measure 4.6.14, which provides for preconstruction surveys and ongoing relocation of identified animals out of construction areas, would reduce impacts on these species to a less-than-significant level.

#### Mitigation Measures

**Measure 4.6.14:** CCWD shall ensure that habitat disturbances are minimized in areas that are known or suspected to support San Joaquin coachwhip and coast horned lizard. Within 30 days before surface-disturbing activities, concurrent with other preconstruction wildlife surveys, a qualified biologist shall survey for special-status reptile populations. If individuals of these species are found in the project area, they shall be relocated to suitable habitat 0.5 mile or farther from the project area. Some individuals may be undetected or enter sites after surveys and would be subject to harm.

**Impact Significance after Mitigation:** Less than Significant.

**Impact 4.6.15: Project construction activities could affect nonlisted special-status mammal species (American badger, special-status bats, and the San Joaquin pocket mouse). (Less than Significant with Mitigation)**

### *Alternative 1*

American badgers are a non-listed species that are found throughout the regional project vicinity and are known to occur in low densities within the watershed (CDFG, 2008). American badgers could be directly affected by vehicle and construction-related mortality at any active construction sites, including those within the watershed and on pipeline routes, at the Expanded Transfer Facility, and near the Delta Intake Facilities. It is not anticipated that this species would be affected by project area noise, dust, or other construction disturbances, with the principal threat being vehicle mortality. The likelihood of encountering this species is considered directly proportional to the scale and duration of construction activities.

Breeding and nonbreeding bats could roost in many of the large sycamore or oak trees that occur in the watershed as well as in trees or structures near pipeline alignments. Crevices in Los Vaqueros Dam could also provide roosting habitat for special-status bats. Focused surveys have not been conducted to document the distribution or types of special-status bats that could be in the study area. Although the loss of individual bats in a nonbreeding roost would not be considered significant, the loss of an active maternity roost, even of relatively common species such as the California myotis (*Myotis californicus*), would be significant. Based on their known range and available habitat in the watershed and along pipeline alignments, bat species that could be affected by the project include the pallid bat, Townsend's big-eared bat, greater western mastiff bat, small-footed myotis bat, long-eared myotis bat, fringed myotis bat, long-legged myotis bat, and Yuma myotis bat.

The San Joaquin pocket mouse is typically found in areas with fine-textured soils. This species was recorded in 2002 near Clifton Court Forebay, about 3.6 miles east of the watershed boundary and 7 miles from the existing Los Vaqueros Dam (CDFG, 2008). Open grasslands and upland scrub communities within the watershed are thought to provide poor quality habitat for the San Joaquin pocket mouse because this species is typically found in areas with friable soils in grasslands and blue oak savannahs (CDFG, 2005). Though not all grasslands habitat is occupied by this species, up to 976.2 acres of permanent impact may occur. Temporary impacts totaling 252.8 acres may occur as follows: other in-watershed facilities (45.8 acres), Delta-Transfer Pipeline (24.2 acres), Transfer-LV Pipeline (76.5 acres), Transfer-Bethany Pipeline (150.9 acres) and Expanded Transfer Facility (1.2 acres). Iodine bush scrub and short grasslands habitat that would generally be avoided within the Power Option 2 Western powerline alignment provide the best available habitat in the project area for this species. This area provides the only local occurrence of this species.

Prior to mitigation, project effects to American badgers, special status bats, and San Joaquin pocket mice would be potentially significant. The implementation of Mitigation Measures 4.6.15a and 4.6.15b would reduce this impact to less-than-significant.

### *Alternative 2*

Potential impacts to nonlisted special-status mammal species due to project implementation under Alternative 2 would be the same as those discussed for Alternative 1. This would constitute a significant impact before mitigation. The implementation of Mitigation Measures 4.6.15a and 4.6.15b would reduce the magnitude of this impact to less-than-significant.

### *Alternative 3*

All facilities proposed under Alternative 3 are discussed under Alternative 1, above. Because a fair likelihood exists that badgers could be encountered on the Transfer-Bethany Pipeline, which would affect about 150.9 acres of annual grassland habitat and is not included in this alternative, the likelihood for incidental badger mortality would be somewhat less under this alternative than for Alternative 1. Project impacts to San Joaquin pocket mice are also expected to be lower in the absence of this pipeline. Impacts to special status bats would be identical under both alternatives.

Prior to mitigation, project effects to American badgers, special status bats, and San Joaquin pocket mice would be potentially significant. The implementation of Mitigation Measures 4.6.15a and 4.6.15b would reduce the magnitude of this impact to less-than-significant.

### *Alternative 4*

Potential impacts to nonlisted special-status mammal species due to project implementation under Alternative 4 would be similar to, but less than those discussed for Alternative 1, with impacts limited to areas within the watershed. As seen for Alternative 3, the absence of pipeline alignments and other project facilities would reduce habitat impacts within grasslands that provide suitable habitat for American badgers and San Joaquin pocket mice, and reduce the likelihood for mortality. Alternative 4 would affect less habitat for these species within the watershed: 498.5 acres of annual grasslands within the watershed (versus 976.2 acres under Alternative 1) and would not incur the temporary impacts totaling 252.8 acres from the Delta-Transfer Pipeline (24.2 acres), Transfer-LV Pipeline (76.5 acres), Transfer-Bethany Pipeline (150.9 acres), and Expanded Transfer Facility (1.2 acres).

Prior to mitigation, project effects to American badgers, special status bats, and San Joaquin pocket mice would be potentially significant. The implementation of Mitigation Measures 4.6.15a and 4.6.15b would reduce the magnitude of this impact to less-than-significant.

#### Mitigation Measures

**Measure 4.6.15a:** CCWD shall minimize impacts on badgers through a combination of worker training, preconstruction surveys, and passively or actively relocating animals. Impacts on the San Joaquin pocket mouse and American badger would be reduced by limiting the footprint of direct project effects within the Western powerline alignment.

- A qualified biologist shall conduct a training session for all construction personnel focused on the protection and conservation of protected, nonlisted special-status wildlife species, including American badgers. At a minimum, the training shall include a species and habitat description for the American badger (in addition to

other nonlisted special-status species). The training session shall identify the general measures that are being implemented to minimize impacts on these species as they relate to the project, and the boundaries within which the project could be accomplished.

- Concurrent with other required surveys (e.g., as required for Mitigation Measure 4.7), during winter/spring months before new project activities, and concurrent with other preconstruction surveys (e.g., kit fox and burrowing owl), a qualified biologist shall perform a pre-activity survey to identify the presence of American badgers. If this species is not found, no further mitigation shall be required. If badgers are identified, they shall be passively relocated using burrow exclusion (e.g., installing one-way doors on burrows) or similar CDFG-approved exclusion methods. In unique situations it might be necessary to actively relocate badgers (e.g., using live traps) to protect individuals from potentially harmful situations. Such relocation could be performed with advance CDFG coordination and concurrence. When unoccupied dens are encountered outside of work areas but within 100 feet of proposed activities, vacated dens shall be inspected to ensure they are empty and temporarily covered using plywood sheets or similar materials.

- If badger occupancy is determined at a given site within the work area, the construction manager should be informed that work should be halted. Depending on the den type, reasonable and prudent measures to avoid harming badgers will be implemented and may include seasonal limitations on project construction near the site (i.e., restricting the construction period to avoid spring-summer pupping season), and/or establishing a construction exclusion zone around the identified site, or resurveying the den a week later to determine species presence or absence.

- To minimize the possibility of inadvertent badger mortality, project-related vehicles shall observe a maximum 20 miles per hour speed limit on private roads.

- To prevent accidental entrapment of badgers or other animals during construction, all excavated holes or trenches greater than 2 feet deep shall be covered at the end of each work day by suitable materials, or escape routes constructed of earthen materials or wooden planks shall be provided. Before filling, such holes shall be thoroughly inspected for trapped animals.

- All food-related trash items (such as wrappers, cans, bottles, and food scraps) shall be disposed of in closed containers and removed daily from the project area.

- To prevent harassment and mortality of badgers or destruction of their dens, no pets shall be allowed in the project area.

Direct impacts to San Joaquin pocket mice would be minimized in the Western powerline alignment under Power Option 2 by limiting project activities within iodine bush scrub and short grasslands habitat to the smallest possible extent. The implementation of Measure 4.6.7b, which provides habitat compensation for temporary and permanent impacts to annual grasslands that are potentially occupied by San Joaquin kit fox, would additionally benefit American badgers and San Joaquin pocket mice.

**Measure 4.6.15b:** CCWD shall minimize impacts on special-status bats by performing preconstruction surveys and creating no-disturbance buffers around active bat roosting sites.

Before construction activities (i.e., ground clearing and grading, including trees or shrub removal) within 200 feet of trees that could support special-status bats, a qualified bat biologist shall survey for special-status bats. If no evidence of bats (i.e., direct observation, guano, staining, or strong odors) is observed, no further mitigation shall be required.

If evidence of bats is observed, CCWD and its contractors shall implement the following measures to avoid potential impacts on breeding populations:

- A no-disturbance buffer of 250-feet shall be created around active bat roosts during the breeding season (April 15 through August 15). Bat roosts initiated during construction are presumed to be unaffected by the indirect effects of noise and construction disturbances. However, the direct take of individuals will be prohibited.

- Removal of trees showing evidence of active bat activity shall occur during the period least likely to affect bats, as determined by a qualified bat biologist (generally between February 15 and October 15 for winter hibernacula, and between August 15 and April 15 for maternity roosts). If the exclusion of bats from potential roost sites is necessary to prevent indirect impacts due to construction noise and human activity adjacent, bat exclusion activities (e.g., installation of netting to block roost entrances) shall also be conducted during these periods. If special status bats are identified in the dam or special allowances must be made to relocate bats, CCWD will coordinate the effort in advance with CDFG.

**Impact Significance after Mitigation:** Less than Significant.

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**Impact 4.6.16: Draining the reservoir during project construction under Alternatives 1, 2, and 3 could affect Pacific Flyway species, including waterfowl and shorebirds. (Less than Significant)**

### *Alternative 1*

Since its completion in 1998, Los Vaqueros Reservoir is used extensively as a stopover for many water-dependent species of waterfowl and shorebirds on the Pacific Flyway. While the reservoir was not created to support migratory birds, the 1,456 acres of open-water and adjacent upland habitats support more than 165 different species of birds. The reservoir provides open-water and freshwater marsh habitats that support an abundance of migratory birds on the Pacific Flyway.

The watershed is noted for its variety of bird life. The Mt. Diablo Audubon Society documented 72,212 birds among 165 different species of birds in their 2006 Christmas bird count (Mueller, pers. comm.). Of these, 53 species are at least partially dependent upon freshwater marsh or open-water habitat provided by the reservoir. Waterfowl species that frequent the reservoir include the Canada goose, wood duck, gadwall, American wigeon, mallard, northern shoveler, northern pintail, green-winged teal, canvasback, redhead, ring-necked duck, greater scaup, lesser scaup, bufflehead, common goldeneye, hooded merganser, common merganser, and ruddy duck. Other birds noted in association with the reservoir include grebes, sandpipers, pelicans, cormorants, egrets, herons, and

gulls. Birds use the reservoir throughout the year, although the site is not used as a long-term stopover as are water bodies in Southern California.

The 3-year or longer absence of open-water and freshwater marsh habitat at the reservoir during dam construction would temporarily eliminate bird foraging and stopover habitat on the Pacific Flyway that has been available to migrating waterfowl since 1998. Elimination of open-water areas would temporarily eliminate foraging opportunities and force migrants to use other nearby aquatic locations. This elimination could be viewed as a potentially significant impact of the project because impacts on migratory birds are a potentially significant impact under CEQA and the MBTA.

However, due to the reservoir's relatively recent creation and the relative abundance of other large, permanent water bodies in the regional project vicinity, the temporary loss of the reservoir is not expected to significantly disrupt birds using the Pacific Flyway. During dam construction, water-dependent migratory birds are expected to use other nearby reservoirs and water bodies as foraging and stopover locations. The closest such features are the Delta and Clifton Court Forebay, but foraging and stopover habitat is also available at Lake Del Valle, the Livermore Chain of Lakes, San Antonio Reservoir, San Leandro Reservoir, Suisun Bay, and San Francisco Bay, among other locations.

After the project is implemented, the expanded reservoir would increase open-water habitat and would not reduce upland habitat quality for migratory birds over the long-term. Thus, the temporary loss of foraging and stopover habitat on the Pacific Flyway would be considered a less-than-significant impact, and no mitigation is required.

### *Alternative 2*

Potential impacts to Pacific Flyway bird species due to project implementation under Alternative 2 would be to the same as those discussed for Alternative 1. Impacts under this alternative would be less than significant with no mitigation required.

### *Alternative 3*

Potential impacts to Pacific Flyway bird species due to project implementation under Alternative 3 would be the same as those discussed for Alternative 1. Impacts under this alternative would be less than significant with no mitigation required.

### *Alternative 4*

Because some water would remain in the Los Vaqueros Reservoir during construction, no impacts to Pacific Flyway bird species would occur.

**Mitigation:** None required.

**Impact 4.6.17: The project would not result in conflicts with local and regional conservation plans, or local plans or ordinances protecting biological resources. (No Impact)**

### *All Project Alternatives*

The Los Vaqueros Watershed lies within the biological inventory area of the East County HCP/NCCP, but outside of the action area and defined mitigation areas (see **Figure 4.6-28**). The HCP/NCCP designates two land "acquisition analysis zones" in the southeastern corner of the county, east of the Los Vaqueros Watershed. These zones were established to focus the HCP/NCCP conservation strategy into distinct geographic areas without specifically identifying individual parcels. The Zone 5 (Byron Hills) and Zone 6 (East County Cultivated Agriculture) zones (see Figure 4.6-28) are relevant to the current analysis because the Los Vaqueros Reservoir Expansion Project would also target mitigation lands in these areas. The project would also identify conservation areas in Alameda County that are outside of the East County HCP/NCCP acquisition analysis zones.

The Los Vaqueros Watershed is identified in the East County HCP/NCCP as public land for the purposes of protecting water supply, natural resources, and recreation, and is not identified as potential East County HCP/NCCP acquisition land. Therefore, proposed facilities sited within the watershed, and mitigation measures to replace and enhance habitat areas within the watershed, would not conflict with any lands targeted by the HCP/NCCP for acquisition. As quantified in this section, habitat impacts outside the Los Vaqueros Watershed are mostly temporary and associated with project pipelines.

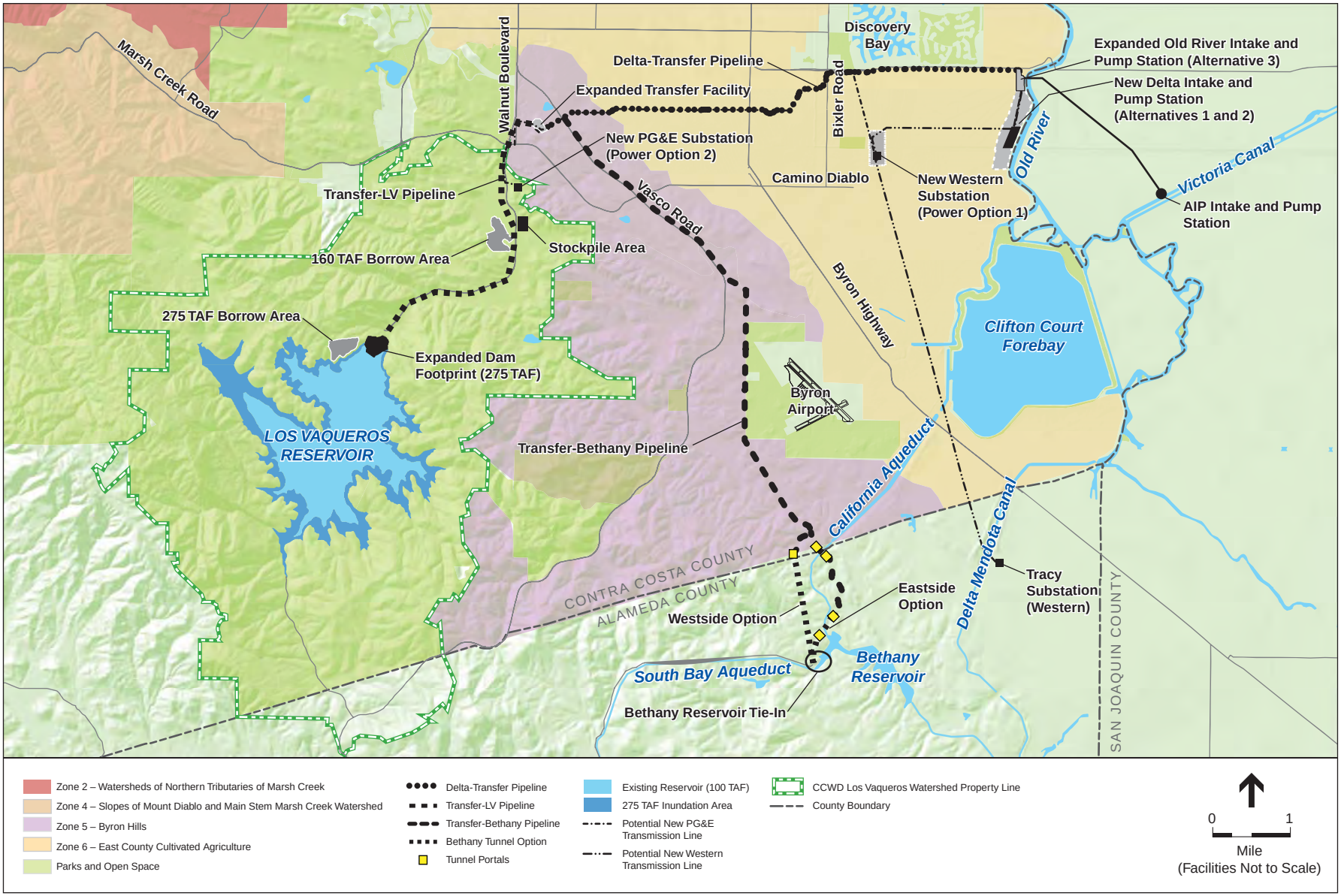
Section 4.6.3 details a comprehensive biological resource mitigation and compensation program that would be implemented for the Los Vaqueros Reservoir Expansion Project and provides for substantial acquisition of mitigation and compensation lands in eastern Contra Costa and Alameda counties. Informal coordination with the East County HCP/NCCP team to date indicates that implementation of the mitigation program for the Los Vaqueros Reservoir Expansion Project could help support the goals and acquisition strategies of the HCP/NCCP without competing for land or conflicting with the conservation goals and objectives of that plan.

Studies completed to date for this project indicate that the region includes ample acreage of suitable habitat to allow implementation of the project mitigation program in concert with the HCP/NCCP. See Section 4.6.3 for further discussion of the framework and guiding principles for the project's biological resource mitigation program.

No local ordinances protecting biological resources apply to the project.

Under all project alternatives, the project would not conflict with the conservation objectives or acquisition goals of the East County HCP/NCCP.

**Mitigation:** None required.




SOURCE: USGS, 1993 (base map); ECCHCP, 2007; and ESA, 2008

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**Figure 4.6-28**

East Contra Costa HCP/NCCP Acquisition Analysis Zones

**Impact 4.6.18: Project construction would not make a cumulatively considerable contribution to cumulative effects on special-status species and habitats. (Less than Significant)**

### *Alternative 1*

As discussed throughout this section, expansion of the Los Vaqueros Reservoir under Alternative 1 would result in both temporary and permanent effects on biological resources in southeastern Contra Costa County. Most of the project impacts on biological resources would occur within CCWD's Los Vaqueros Watershed. Reservoir expansion would inundate an additional 1,000 acres of habitat, mostly grasslands, and represents the majority of the permanent impact the project would have on biological resources. Other projects in the region would also contribute to the incremental loss of biological resources habitat. As identified in Section 4.1, Approach to the Environmental Analysis, these projects include the Cecchni Ranch development in Discovery Bay, Discovery Bay/Bryon Wastewater Treatment Plant Upgrade, Alternative Intake Project, Zone 7 Altamont Water Treatment plant and Pipeline, DWR South Bay Aqueduct Enlargement Project, and Mountain House Community in northwestern San Joaquin County. Environmental analysis is either underway or completed for most of these projects, and several are presently under construction.

Although the Los Vaqueros Reservoir Expansion Project would result in permanent loss of habitat, mitigation measures have been identified to reduce these effects to less than significant levels. As discussed in Section 4.6.3, CCWD proposes to implement a comprehensive biological resources mitigation program that integrates land acquisition, restoration, enhancement, and long-term preservation and management to compensate for project impacts on biological resources. The existing Los Vaqueros Watershed is an example of CCWD's effective mitigation for the original reservoir project and the District's resource management has provided a net benefit for some habitats and biological resources. The mitigation program for the Los Vaqueros Reservoir Expansion Project would be designed to complement the habitat and species conservation goals and principles established by the East County HCP/NCCP. Implementation of this mitigation program would significantly advance the goals of the East County HCP/NCCP by securing, enhancing, and protecting both a substantial amount of additional biological resources habitat in the region and habitat in strategic locations that can provide valuable linkages among other conservation areas in the region. Given the scope of the mitigation program to be implemented for this project to address effects on biological resources, the effects of the project are considered less than significant after mitigation and the project would not make a cumulatively considerable contribution to potential cumulative effects on biological resources and habitat in the region.

One impact of the project is considered to be significant and unavoidable—the loss of the potential kit fox movement corridor in the grassland area west of the existing reservoir (Impact 4.6.7). This grassland area would be inundated as a result of reservoir expansion. While use of this potential movement corridor has not been documented, because the grassland is suitable habitat for the kit fox, loss of this grassland is considered significant and unavoidable. No other project planned or proposed in the region would also affect this specific potential movement corridor, so no cumulative impact to the corridor would occur.

Elsewhere in the region, other projects within the Diablo Hills and eastern Contra Costa County area that may contribute to the permanent or temporary loss of grassland habitat and effects to San Joaquin kit fox habitat or movement corridors include the Zone 7 Altamont Water Treatment Plant and Pipeline, which would result in the permanent loss of fewer than 40 acres of annual grasslands habitat near the terminus of Dyer Road in Alameda County. This project is not expected to affect kit fox movement corridors and does not appreciably impact habitat for this species. The California Department of Water Resources South Bay Aqueduct Enlargement Project, presently under construction in northern Alameda County, will temporarily affect about 60 acres of annual grasslands habitat in the northern range of the kit fox, and will permanently impact about 25 acres of habitat to accommodate Dyer Reservoir. The SR 4 Highway Widening Project would have only a minor, temporary impact on kit fox habitat and movement.

The Mountain House Community in northwestern San Joaquin County is near the foot of the Diablo Range north of Interstate 205. This phased, 5,000-acre residential and commercial development project, which is identified in the San Joaquin County Multiple Species Habitat Conservation Plan, occupies annual grasslands and former agricultural lands that presumably provided moderate to high habitat values for San Joaquin kit foxes. This project could present a barrier to north-south kit fox movement through agricultural portions of the Valley floor. The environmental reviews conducted for the Mountain House Specific Plan considered direct project effects upon occupied kit fox denning and foraging habitat; however, effects to movement corridors were not identified (County of San Joaquin, 2008). Because the Los Vaqueros Reservoir Project is over 10 miles from the Mountain House Community, and would not affect the same area of potential kit fox movement, the two projects would not result in a significant cumulative impact to kit fox movement corridors.

The implementation of Alternative 1 would not conflict with a land use plan adopted for the purpose of avoiding or mitigating a significant environmental effect, or with an applicable HCP or NCCP.

### *Alternative 2*

Cumulative effects for this alternative would be the same as those described for Alternative 1.

### *Alternative 3*

Cumulative effects for this alternative would be the same as those described for Alternative 1, although fewer facilities would be developed under Alternative 3 compared to Alternative 1.

### *Alternative 4*

Cumulative effects for this alternative would be similar to those described for Alternative 1, although fewer facilities would be developed under Alternative 4 compared to Alternative 1.

#### Mitigation

Implementation of measures identified throughout this section to address project effects on terrestrial biological resources would also reduce the project's contribution to cumulative

effects to a less-than significant level (4.6.1a, 4.6.1b, 4.6.2a, 4.6.2b, 4.6.3a, 4.6.3b, 4.6.4a, 4.6.4b, 4.6.5, 4.6.6a, 4.6.6b, 4.6.7a, 4.6.7b, 4.6.7c, 4.6.8a, 4.6.8b, 4.6.9a, 4.6.9b, 4.6.10a, 4.6.10b, 4.6.11, 4.6.12a, 4.6.12b, 4.6.14, 4.6.15a, and 4.6.15b). These measures would mitigate both direct and indirect impacts of the project alternatives.

**Impact Significance after Mitigation:** Less than Significant.

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# 4.6.3 Comprehensive Biological Resources Mitigation and Compensation Program

## Introduction

This section summarizes the comprehensive biological resource mitigation and compensation program that is being developed in consultation with federal and state resource agencies to satisfy both the mitigation requirements identified in this EIS/EIR and the anticipated permit requirements. The following discussion summarizes project impacts on biological resources (plant communities, wetlands, and special-status species habitats) presented in Section 4.6.2, describes the habitat compensation requirements (acreage) to address these impacts, outlines the principles that will guide project mitigation, and summarizes the findings regarding the availability of suitable land for acquisition to meet the projected requirements for habitat compensation.

Previous and ongoing analyses indicate that suitable lands are available to meet project mitigation needs and show that project objectives are consistent with and complementary to the mitigation goals and strategies put forward under the East County HCP/NCCP approved in July 2007. Like the HCP/NCCP, this program provides a comprehensive framework for species and ecosystem conservation that addresses short- and long-term conservation needs. The proposed mitigation strategy for the project identifies the following:

- Key wildlife and habitat types affected by the project
- Individual species that are members of the plant or wildlife communities that depend on the impacted habitat types
- CALFED habitat compensation guidelines (CALFED, 2000)
- Habitat compensation and conservation opportunities that may be available outside of the watershed

Key factors in identifying suitable mitigation lands include the scarcity of the habitat type, ability to restore or enhance as habitat, and importance to regional conservation due to the strategic location or the particular importance of the lands as habitat for a sensitive status species (e.g., expanding contiguous habitat/corridors or protecting key habitat areas that are subject to isolation or substantial modification). Acquisitions of these types of lands would also comprehensively provide a net long-term benefit to biological resources in the project region beyond the current, pre-project conditions. These goals set by CCWD are also consistent with the MSCS (CALFED, 2000).

## Summary of Potential Impacts and Mitigation Requirements

### *Impacts*

**Tables 4.6-17**, **4.6-18**, and **4.6-19** summarize project impacts to CALFED/NCCP habitat types and associated special-status species that require compensatory mitigation under the various project alternatives.

The general habitat types that would be affected by the project are:

- Grassland habitat, which includes upland vegetation communities dominated by introduced and native annual and perennial grasses and forbs, including nonirrigated and irrigated pasturelands. Under Alternatives 1 and 2, the project would impact 1,505.6 acres of grasslands habitat, which provide habitat for San Joaquin kit foxes, California tiger salamanders, and California red-legged frogs. Portions of the impacted in-watershed acreage also support Alameda whipsnakes. Lesser impacts were identified under Alternative 3 (1,354.7 acres) and Alternative 4 (819.1 acres) (see Tables 4.6-17, 4.6-18, and 4.6-19).

- Valley Oak Woodland and Riparian habitat, which includes all successional stages of woody vegetation commonly dominated by willow, Fremont cottonwood, valley oak, or western sycamore within the active and historical floodplains of low-gradient reaches of streams and rivers; also, non-riparian forest, woodland, and savanna of valleys and foothills commonly dominated by valley oak, blue oak, interior live oak, coast live oak, and foothill pine. Alternatives 1, 2, and 3 would impact 163.3 acres of Valley Oak Woodland and Riparian habitat, all within the watershed, which provides habitat for San Joaquin kit foxes, California tiger salamanders, and California red-legged frogs. Portions of the impacted acreage also support Alameda whipsnakes. Alternative 4 would impact 34.3 acres of Valley Oak Woodland and Riparian habitat (see Tables 4.6-17, 4.6-18, and 4.6-19).

- Upland Scrub habitat, which includes habitat dominated by shrubs characteristic of coastal scrub and chaparral scrub communities. The majority of the scrub habitat within the watershed is chaparral and may include California sagebrush, chamise, wedgeleaf ceanothus, and common manzanita. Under Alternatives 1, 2, and 3, the project would impact 7.0 acres of Upland Scrub habitat, which provides primary habitat for Alameda whipsnakes, and may also support dispersing California tiger salamanders and California red-legged frogs. Impacts under Alternative 4 are 6.7 acres (see Tables 4.6-17, 4.6-18, and 4.6-19).

Seasonal construction constraints presented by terrestrial biological resources (California red-legged frogs and breeding birds, including golden eagles and Swainson's hawks) are summarized in **Table 4.6-20**.

### *Mitigation Requirements*

The amount of habitat to be acquired for mitigation purposes outside of the watershed is guided by measures identified in the MSCS (CALFED, 2000) and input provided during ongoing strategic planning meetings with CDFG and USFWS staff. The mitigation requirements presented in Tables 4.6-17, 4.6-18, and 4.6-19 present both low and high compensation ratios, resulting in a range of potentially required mitigation lands for each habitat type. For example, the MSCS identifies that Upland Scrub habitat shall be replaced at a mitigation ratio between 2:1 (mitigation

**TABLE 4.6-17**
**HABITAT IMPACTS AND MITIGATION SUMMARY, ALTERNATIVES 1 AND 2**

| | | HABITAT IMPACTS (ACRES) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Impacted Nonconservation Lands | | | Impacted CDFG Kit Fox Conservation Lands | | | |
| **HABITAT TYPE**[a] | | **Temporary** | **Long -Term Temporary** | **Permanent** | **Temporary** | **Long-Term Temporary** | **Permanent** | **Isolated SJKF Grasslands** |
| Grasslands | | | | | | | | |
| In-Watershed (s*upports SJKF, CTS, and CRLF; some AWS*) | | 15,8 | 0.0 | 535.9 | 11.0 | 20.0 | 440.3 | 214.6 |
| Out-of-Watershed (s*upports SJKF, CTS, and CRLF*) | | 266.8 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **Subtotal** | 282.6 | 0.0 | 537.1 | 11.0 | 20.0 | 440.3 | 214.6 |
| | ***Total Grassland Impact: 1,505.6 acres*** | | | | | | | |
| Valley Oak Woodland and Riparian | | | | | | | | |
| *Supports SJKF, CTS, CRLF, and AWS* | | 28.6 | 0.0 | 81.1 | 3.8 | 0.0 | 49.8 | NA |
| | ***Total Valley Oak Woodland and Riparian Impact: 163.3 acres*** | | | | | | | |
| Upland Scrub (In-Watershed) | | | | | | | | |
| *Primarily AWS habitat, also CTS and CRLF* | | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 6.7 | NA |
| | ***Total Upland Scrub Impact: 7.0 acres*** | | | | | | | |
| MITIGATION AND COMPENSATION SUMMARY [b] | | | | | | | | |
| Annual Grasslands | | | | | | | | |
| Habitat Compensation Ratio Ranges for San Joaquin Fox. Mitigation also compensates for habitat losses for CRLF and CTS Low 1:1 / High 3:1 | | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 3:1 |
| Grasslands Compensation Acreage Required | | 282.6 to 310.9 | 0.0 | 537.1 to 1,611.3 | 11.0 to 12.1 | 20.0 to 40.0 | 440.3 to 1,320.9 | 214.6 to 643.8 |
| | **Total Grassland Mitigation Requirement: 1,505.6 to 3,939.0 acres** | | | | | | | |
| Oak Woodlands and Riparian Habitat | | | | | | | | |
| Oak Woodland and Riparian Conservation Required, Low (2:1) to High (3:1) | | 57.2 to 85.8 | 0.0 | 162.2 to 243.3 | 7.6 to 11.4 | 0.0 | 99.6 to 149.4 | NA |
| | **Total Oak Woodland and Riparian Mitigation Requirement: 326.6 to 489.9 acres** | | | | | | | |
| Upland Scrub | | | | | | | | |
| Upland Scrub Conservation Acreage Required: Low (2:1) to High (5:1) | | 0.0 | 0.0 | 0.0 | 0.6 to 1.5 | 0.0 | 13.4 to 33.5 | NA |
| | **Total Upland Scrub Mitigation Requirement: 14.0 to 34.8 acres** | | | | | | | |

[a] SJKF = San Joaquin kit fox; CTS = California tiger salamander; CRLF = California red-legged frog; AWS = Alameda whipsnake
[b] Compensation ratios shown are from CALFED MSCS, 2000, Table D.

**TABLE 4.6-18**
**HABITAT IMPACTS AND MITIGATION SUMMARY, ALTERNATIVE 3**

| HABITAT TYPE[a] | HABITAT IMPACTS (ACRES) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Impacted Nonconservation Lands | | | Impacted CDFG Kit Fox Conservation Lands | | | |
| | Temporary | Long -Term Temporary | Permanent | Temporary | Long-Term Temporary | Permanent | Isolated SJKF Grasslands |
| Grasslands | | | | | | | |
| In-Watershed (s*upports SJKF, CTS, and CRLF; some AWS*) | 15.8 | 0.0 | 535.9 | 11.0 | 20.0 | 440.3 | 214.6 |
| Out-of-Watershed (s*upports SJKF, CTS, and CRLF*) | 115.9 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Subtotal** | 131.7 | 0.0 | 537.1 | 11.0 | 20.0 | 440.3 | 214.6 |
| ***Total Grassland Impact: 1,354.7 acres*** | | | | | | | |
| Valley Oak Woodland and Riparian | | | | | | | |
| *Supports SJKF, CTS, CRLF, and AWS* | 28.6 | 0.0 | 81.1 | 3.8 | 0.0 | 49.8 | NA |
| ***Total Valley Oak Woodland and Riparian Impact: 163.3 acres*** | | | | | | | |
| Upland Scrub (In-Watershed) | | | | | | | |
| *Primarily AWS habitat, also CTS and CRLF* | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 6.7 | NA |
| ***Total Upland Scrub Impact: 7.0 acres*** | | | | | | | |
| MITIGATION AND COMPENSATION SUMMARY [b] | | | | | | | |
| Annual Grasslands | | | | | | | |
| Habitat Compensation Ratio Ranges for SJKF. Mitigation also compensates for upland habitat losses for CRLF and CTS | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 3:1 |
| Low 1:1 \ High 3:1 | | | | | | | |
| Grasslands Compensation Acreage Required | 131.7 to 144.9 | 0 | 537.1 to 1,611.3 | 11.0 to 12.1 | 20.0 to 40.0 | 440.3 to 1,320.9 | 214.6 to 643.8 |
| **Total Grassland Mitigation Requirement: 1,354.7 to 3,773.0 acres** | | | | | | | |
| Oak Woodlands and Riparian Habitat | | | | | | | |
| Oak Woodland and Riparian Conservation Required, Low (2:1) to High (3:1) | 57.2 to 85.8 | 0.0 | 162.2 to 243.3 | 7.6 to 11.4 | 0.0 | 99.6 to 149.4 | NA |
| **Total Oak Woodland and Riparian Mitigation Requirement: 326.6 to 489.9 acres** | | | | | | | |
| Upland Scrub | | | | | | | |
| Upland Scrub Conservation Acreage Required: Low (2:1) to High (5:1) | 0.0 | 0.0 | 0.0 | 0.6 to 1.5 | 0.0 | 13.4 to 33.5 | NA |
| **Total Upland Scrub Mitigation Requirement: 14.0 to 34.8 acres** | | | | | | | |

[a] SJKF = San Joaquin kit fox; CTS = California tiger salamander; CRLF = California red-legged frog; AWS = Alameda whipsnake
[b] Compensation ratios shown are from CALFED MSCS, 2000, Table D.

**TABLE 4.6-19**
**HABITAT IMPACTS AND MITIGATION SUMMARY, ALTERNATIVE 4**

| HABITAT TYPE[a] | | HABITAT IMPACTS (ACRES) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Impacted Nonconservation Lands | | | Impacted CDFG Kit Fox Conservation Lands | | | |
| | | Temporary | Long -Term Temporary | Permanent | Temporary | Long-Term Temporary | Permanent | Isolated SJKF Grasslands |
| Grasslands | | | | | | | | |
| In-Watershed (s*upports SJKF, CTS, and CRLF; some AWS*) | | 19.2 | 0.0 | 348.2 | 0.0 | 0.0 | 150.3 | 301.4 |
| Out-of-Watershed (s*upports SJKF, CTS, and CRLF*) | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | **Subtotal** | 19.2 | 0.0 | 348.2 | 0.0 | 0.0 | 150.3 | 301.4 |
| | ***Total Grassland Impact : 819.1 acres*** | | | | | | | |
| Valley Oak Woodland and Riparian | | | | | | | | |
| *Supports SJKF, CTS, CRLF, and AWS* | | 13.6 | 0.0 | 0.0 | 0.0 | 0.0 | 20.7 | NA |
| | ***Total Valley Oak Woodland and Riparian Impact: 34.3 acres*** | | | | | | | |
| Upland Scrub (In-Watershed) | | | | | | | | |
| *Primarily AWS habitat, also CTS and CRLF* | | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 6.4 | NA |
| | ***Total Upland Scrub Impact: 6.7 acres*** | | | | | | | |
| MITIGATION AND COMPENSATION SUMMARY [b] | | | | | | | | |
| Annual Grasslands | | | | | | | | |
| Habitat Compensation Ratio Ranges for SJKF Mitigation also compensates for upland habitat losses for CRLF and CTS. Low 1:1\ High 3:1 | | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 1.1:1 | 1:1 to 2:1 | 1:1 to 3:1 | 1:1 to 3:1 |
| Grasslands Compensation Acreage Required | | 19.2 to 21.1 | 0.0 | 348.2 to 1,044.6 | 0.0 | 0.0 | 150.3 to 450.9 | 301.4 to 904.2 |
| | **Total Grassland Mitigation Requirement: 819.1 to 2,420.8 acres** | | | | | | | |
| Oak Woodlands and Riparian Habitat | | | | | | | | |
| Oak Woodland and Riparian Conservation Required, Low (2:1) to High (3:1) | | 27.2 to 40.8 | 0.0 | 0.0 | 7.6 to 11.4 | 0.0 | 41.4 to 62.1 | NA |
| | **Total Oak Woodland and Riparian Mitigation Requirement: 76.2 to 114.3 acres** | | | | | | | |
| Upland Scrub | | | | | | | | |
| Upland Scrub Conservation Acreage Required: Low (2:1) to High (5:1) | | 0.0 | 0.0 | 0.0 | 0.3 to 1.5 | 0.0 | 12.8 to 32.0 | NA |
| | **Total Upland Scrub Mitigation Requirement: 13.1 to 33.5 acres** | | | | | | | |

[a] SJKF = San Joaquin kit fox; CTS = California tiger salamander; CRLF = California red-legged frog; AWS = Alameda whipsnake
[b] Compensation ratios shown are from CALFED MSCS, 2000, Table D.

**TABLE 4.6-20**
**SEASONAL CONSTRUCTION CONSTRAINTS FROM TERRESTRIAL BIOLOGICAL RESOURCES**

| Species | Constraint |
|---|---|
| California red-legged frog (Impact 4.6.4) | Work within or next to aquatic breeding habitat will be conducted between May 1 and November 1. Activities below Los Vaqueros Dam and in the Inlet/Outlet Pipelines construction area that affected aquatic breeding habitat, including Kellogg Creek, shall be initiated during this period and may thereafter continue year-round. |
| Breeding birds (Impacts 4.6.8, 4.6.9, and 4.6.12) | <u>For all breeding birds during the breeding season:</u><br>For work during the breeding season (February 1 though August 31), specific measures would be applied to avoid impacts to nesting raptors and MBTA birds species to include:<br>• Preconstruction surveys<br>• Establishment of buffer zones around active nests as follows<br>- 250 feet for passerine bird nests and 500 feet for raptor nests<br>- 250 feet for active burrowing owl nests<br>- 0.25-mile buffer zone around Swainson's hawk nests between March 15 and September 15<br>- 500 foot buffer for golden eagles between March 1 and August 15 (or initiate work at specific sites outside the nesting period)<br><br><u>For burrowing owls only during the non-breeding season:</u><br>For work within suitable habitat during the nonbreeding season (September 1 through January 31) the following mitigation is required for burrowing owls:<br>• Preconstruction surveys<br>• Establishment of 160-foot buffer zones around occupied burrows |

acreage: impacted acreage) and 5:1. These ratios are considered guidelines; the permitting agencies will determine project requirements on a case-by-case basis depending upon factors such as the quality of the impacted habitat and the ability of replacement habitat to emulate displaced functions and values. **Table 4.6-21** lists the acreages of habitat needed to mitigate impacts under the four project alternatives.

The approach used in this analysis to compensate for anticipated impacts to these habitat types is to acquire and manage large areas of comparable habitat outside of the watershed but within eastern Contra Costa County and Alameda County. However, for habitats such as valley/foothill riparian and wetlands, mitigation efforts would most likely consist primarily of restoration and enhancement of existing habitats within the watershed.

Note that the mitigation for San Joaquin kit fox (grasslands) habitat will likely extend beyond Contra Costa County into northeastern Alameda County because of the special habitat considerations for the species, as well as to provide a greater regional conservation benefit. The prioritization of mitigation lands for acquisition shall consider factors other than just acreage, such as the Recovery Plan for kit foxes, connectivity between habitats (i.e., linkage and movement), current species' range, and other data to maximize benefits to the species. It is likely that land acquisition will concentrate on strategic locations within the region, generally north of Interstate 580, within or next to the Altamont Hills that advance the conservation and recovery objectives of this species. Lands just south of Interstate 580 that provide habitat benefits to maintain north-south habitat continuity are also eligible for consideration.

**TABLE 4.6-21**
**ACREAGE OF HABITATS IDENTIFIED FOR ACQUISITION**

| | Habitat Affected (Acres)[a] | | | Conservation Ratios[b] | | Acreage of Conservation Habitat Needed for Alts 1 and 2 | | Acreage of Conservation Habitat Needed for Alt 3 | | Acreage of Conservation Habitat Needed for Alt 4 | | Acres[c] of Habitat on Private Lands Identified within Eastern Contra Costa County[d] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Alts 1and 2 | Alt 3 | Alt 4 | Low Ratio | High Ratio | Low Estimate | High Estimate | Low Estimate | High Estimate | Low Estimate | High Estimate | |
| **Grassland** | 1,505.6 | 1,354.7 | 819.1 | 1:1 temp<br>1:1 perm | 1:1 temp<br>3:1 perm | 1,505.6 | 3,939.0 | 1,354.7 | 3,773.0 | 819.1 | 2,420.8 | 26,994 |
| **Valley/Foothill Riparian** | 2.8 temp/<br>0.9 perm | Same as Alt. 1 | 0 | 2:1 | 3:1 | 7.4 | 11.1 | 7.4 | 11.1 | 0 | 0 | 299 |
| **Valley/Foothill Woodland and Forest (BLO = blue oak. VO = valley oak)** | BLO: 114.3/ 9.0 at mit. sites<br>VO: 31.6 perm/128.0 a t mit. sites | Same as Alt 1 | BLO: 17.6 perm/ 9.0 at mit. sites<br>VO: 31.6 perm/ 128.0 at mit. sites | 2:1 | 3:1 | BLO: 246.6<br>VO: 319.2 | BLO: 369.3<br>VO: 478.8 | BLO: 246.6<br>VO: 319.2 | BLO: 369.3<br>VO: 478.8 | BLO: 53.2<br>VO: 319.2 | BLO: 79.8<br>VO: 478.8 | 12,304 |
| **Upland Scrub** | 7.0 | 7.0 | 6.7 | 2:1 | 5:1 | 14.0 | 35.0 | 14.0 | 35.0 | 13.1 | 33.5 | 431 |
| **Total** | 1,847.0 | 1,696.1 | 842.6 | | | 2,092.8 | 4,833.2 | 1,941.9 | 4,667.2 | 3,012.9 | 3,012.9 | 40,028 |

[a] Calculated from maximum potential impacts.
[b] Specifies a quantitative mitigation factor identified in the MSCS (CALFED, 2000) Table D.
[c] Acres on private lands identified in East Contra Cost County HCP/NCCP study area. Includes all riparian habitats, woodlands on parcels with 20 acres or more of habitat, upland scrub with 20 acres or more of habitat, and grasslands with 40 acres or more of habitat.
[d] Does not include lands identified in northeastern Alameda County that are presently under analysis.

mit. = mitigation
perm = permanent
temp = temporary

The East County HCP/NCCP identified suitable core habitat for kit foxes and potential primary movement routes within the watershed as well as areas surrounding the watershed that connect existing protected lands as part of the species' conservation strategy (East County HCPA, 2006). USFWS has also identified "satellite" populations at the northern extent of the San Joaquin kit fox's range in Contra Costa County that may include Herdlyn Watershed, south of Los Vaqueros Watershed, and Round Valley Regional Preserve, north of Los Vaqueros Watershed (Larsen, pers. comm.). The range of this species in the northern portion of its range is presented in Figure 4.6-11.

The *Recovery Plan for Upland Species of the San Joaquin Valley* has further identified as primary recovery actions the protection of existing habitat for federally and state-listed San Joaquin kit foxes in the northern portion of its range *and* protection of existing San Joaquin kit fox connections between habitat in Contra Costa County and habitat farther south (USFWS, 1998). Therefore, acquiring lands within Alameda County and the HCP/NCCP Planning area would provide additional opportunities to further maintain local and regional kit fox corridors and contribute toward the species' recovery.

## Mitigation Lands Opportunities

Private lands for potential acquisition for conservation and enhancement purposes were identified using a combination of existing plans and policies, aerial photography, field surveys, and GIS analyses. Private lands include those properties that are not under the ownership of any municipalities or public agencies. For example, all state and county parks, water district and flood control district lands, schools, and federal lands are considered public lands and are excluded from this designation.

To quantify potentially available lands by habitat type, East County HCP/NCCP electronic data were compared with CALFED NCCP habitat designations for consistency of habitat designations.

The East County HCP/NCCP identified and prioritized potential habitat acquisition areas that would meet the goals of its plan. These habitat areas were mapped as existing within public or private lands using the Contra Costa County parcel database information. Then, using satellite imagery taken from 2005 and 2006, ESA, Inc. updated the HCP information to exclude habitat on private lands that had been developed since the HCPs inception. Then, to determine the acreage of potentially available lands, the private lands data were queried to include parcels containing the following: habitat areas greater than or equal to 20 acres for valley/foothill woodland and forest and upland scrub habitats; and habitat areas greater than or equal to 40 acres for grassland habitat. Due to the relative scarcity and geography of riparian habitat on the landscape, no minimum acreage was set for this habitat type.

To develop a methodology to prioritize potentially available private lands, field reconnaissance surveys were conducted to corroborate qualitative habitat assessments made using aerial imagery. The goal was to develop a key of habitat characteristics that corresponded to suitable habitat (i.e., comparable to or better than those habitats potentially affected by the project) to prioritize potentially available public lands for acquisition. These surveys focused on valley/foothill woodland and forest, and upland scrub habitats. Grassland and riparian habitats were not surveyed because grasslands are considered to be fairly uniform throughout the region and riparian habitats would most likely

be restored and/or enhanced within the watershed. Examples employing this methodology are included below.

### *Grassland*

Land acquisition efforts for grasslands would focus on acquiring comparable or higher quality grassland habitat than that impacted by the project. Grassland habitat, which is the most dominant habit in the watershed, includes upland vegetation communities dominated by introduced and native annual and perennial grasses and forbs, such as nonirrigated and irrigated pasturelands. Grassland covers 12,819 acres, or 77 percent of the watershed (ESA, 2004).

Alternatives 1 and 2 would affect 1,505.6 acres of grassland, Alternative 3 would affect 1,354.7 acres, and Alternative 4 would affect 819.1 acres. A breakdown of temporary versus permanent project effects is presented in Tables 4.6-17, 4.6-18, and 4.6-19. The maximum number of acres required for grassland mitigation under Alternatives 1 and 2 is estimated at 3939.0 acres (see Table 4.6-21). The amount of grassland habitat potentially available for acquisition in Contra Costa County is 26,994 acres—more than 6 times the amount of grassland mitigation lands required. Additional suitable lands are available in Alameda County.

### *Valley/Foothill Riparian*

Mitigation efforts for valley/foothill riparian habitat focused on restoration and enhancement of riparian habitat within the watershed. Valley/foothill riparian habitat includes all successional stages of woody vegetation, commonly dominated by willow, Fremont cottonwood, valley oak, or sycamore, within the active and historical floodplains of low-gradient reaches of streams and rivers generally below a 300-foot elevation.

Alternatives 1 through 3 would impact 3.7 acres of valley/foothill riparian habitat (principally cottonwood habitat), and Alternative 4 would impact 0.09 acre of valley/foothill riparian habitat. The maximum number of acres estimated to be required for mitigation of woody riparian habitat would be 11.1 acres.

About 299 acres of valley/foothill riparian habitat have been identified as available for acquisition within eastern Contra Costa County, and 67 acres have been identified as available for restoration and enhancement within the watershed. Mitigation for riparian habitat would primarily involve restoration and enhancement of existing or disturbed habitat within the watershed, and acquisition of riparian habitats as needed to meet potential maximum mitigation requirements.

### *Valley/Foothill Woodland and Forest*

Land acquisition efforts for valley/foothill woodland and forest would focus on acquiring comparable or higher quality oak woodland and oak savanna habitats than those impacted by the project. Oak habitat covers 3,010 acres, or 18 percent of the watershed, and is the second most common habitat type within the watershed (ESA, 2004). Oak woodland has relatively dense stands of oaks and may include more shrubs in the understory, while oak savanna characteristically contains fewer and widely spaced individual oak trees with an open canopy and grassland understory.

Alternatives 1, 2, and 3 would permanently impact 114.3 acres of blue oak woodland and forest and 9.0 acres of blue oak mitigation lands, 31.6 acres of valley oak woodland and forest, and 128.0 acres of valley oak mitigation lands. Alternative 4 would permanently impact 17.6 acres of blue oak woodland and forest plus 9.0 acres of blue oak mitigation lands, 31.6 acres of valley oak woodland and forest, and 128.0 acres of valley oak mitigation lands. The maximum number of acres estimated to be required for mitigation of Valley/Foothill Woodland and Forest would be 369.3 acres of blue oak habitat and 478.8 acres of valley oak habitat.

About 12,304 acres, significantly more than the required amount of valley/foothill woodland and forest habitat, have been identified as potentially available for acquisition within eastern Contra Costa County.

### *Upland Scrub*

Land acquisition efforts for upland scrub habitat (i.e., chaparral), would focus on acquiring comparable or higher quality chaparral habitat than that impacted by the project. Chaparral habitat comprises about 775 acres, or about 4 percent, of the watershed (ESA, 2004). Within the watershed chaparral habitat generally occurs along ridges and upper slopes as homogeneous patches within oak woodland. Outside of the watershed, chaparral habitat occurs in a similar fashion, usually surrounded by or next to stands of oak woodland. Therefore, it is both logical and preferable to acquire areas of chaparral habitat that are also within suitable stands of oak woodland to preserve general habitat continuity.

Alternatives 1 through 3 would impact 7.0 acres of chaparral habitat, while Alternative 4 would impact up to 6.7 acres. The maximum number of acres required for mitigation of chaparral habitat is estimated at 35 acres. The amount of chaparral habitat potentially available for acquisition is 431 acres, more than 10 times the amount required, and does not include available lands in Alameda County.

## Mitigation Site Selection and Acquisition Priorities

### *Mitigation Land Acquisition Strategy*

For purposes of maximizing habitat value and wildlife benefits, the highest priority sites for acquisition and management would consist of:

- Large contiguous areas of habitat that are both near and distant from development and urban centers that provide key values for San Joaquin kit foxes, but also for California tiger salamanders, California red-legged frogs, and/or Alameda whipsnakes
- Lands next to or near the watershed or other existing land reserves

Large contiguous areas of land are considered to be ideal because they offer a smaller perimeter-to-area ratio and would be less likely to become fragmented. Areas near urban centers or rapidly growing suburbs may be threatened by encroaching development. Similarly, areas far from developed areas and near or next to existing reserves are less likely to be impacted by development and would provide large continuous areas of undisturbed habitat for wildlife.

Strategically located lands in agricultural development may also be considered higher priority for acquisition, either to ensure lands remain in continued agricultural use, or to abate the long-term habitat modification and degradation threats. While these lands may be smaller in size and closer to existing urban lands, they can be considered to be in greater jeopardy than more remote or distant properties.

The selection of acquisition lands would be an ongoing process performed in coordination with multiple parties, including regulatory agencies, land management agencies, and CCWD to develop an acceptable mitigation strategy and approach. Multiple factors would need to be considered when selecting the potential lands for acquisition. Such factors include the habitat suitability in terms of habitat size, continuity, and value to wildlife, particularly endangered species. In addition, the parcels' proximity to existing preserves and other suitable parcels would be considered.

### *Mitigation Site Selection Strategy*

#### Habitat Suitability

The use of aerial imagery and professional judgment would be key to identifying suitable mitigation habitat (i.e., comparable or higher quality than lands potentially impacted). The goal is to develop a methodology of desktop review that can be used to further refine lands potentially available for acquisition that would meet the project's mitigation needs, not only on a quantitative basis, but on a qualitative basis as well.

Field reconnaissance of oak woodland and chaparral habitats confirms that habitat type, overall habitat quality, the degree of local development, and potential functional values relative to target species can be assessed from aerial photos. It is important to note, however, that this preliminary screening process is an initial tool to identify potentially suitable mitigation lands, and would be ground-truthed to verify site conditions before reaching a recommendation of site acquisition.

To further refine the habitat value of potential mitigation lands for wildlife species, subject parcels would be compared to the value of impacted habitats within the watershed. Baseline data collected within the watershed include an evaluation of habitats for wildlife value using USFWS' HEP. The HEP is a method of assessing the functional value of a habitat for a representative species for that habitat using specific habitat criteria. Using the HEP would help further prioritize mitigation land acquisition in the next steps.

## Conclusions

The mitigation program continues to be refined in consultation with the resource agencies to address project effects on biological resources. Evaluation of land within the eastern county region shows that the acreage of land identified in eastern Contra Costa County for potential acquisition greatly exceeds the compensatory needs of the Los Vaqueros Reservoir Expansion Project. Lands that are presently under analysis in Alameda County further bolster the available pool of mitigation lands.