4.6 Biological Resources

4.6 Biological Resources

This section provides a program-level evaluation of the potential effects of constructing and operating the proposed WSIP facility improvement projects on terrestrial biological resources and aquatic resources. Chapter 5 deals separately with the effects of the proposed water supply and system operations, including effects on fisheries and other biological resources associated with the water supply sources.

This discussion of potential effects begins by providing a broad regional context and then focuses on those sensitive habitats and key special-status species that have the highest degree of ecological sensitivity and legal protection. "Key special-status species" include those that have been formally listed or designated under the California and Federal Endangered Species Acts or identified as having special sensitivity in the WSIP program area.[1] At the programmatic level, this PEIR describes the nature and magnitude of potential WSIP impacts on key special-status species and sensitive habitats and frames appropriate mitigation strategies where necessary. Separate, project-level CEQA review will be conducted as appropriate for the WSIP projects; this review will describe project impacts on the full range of biological resources more precisely and, where necessary, tailor the mitigation measures presented in Chapter 6 to site-specific project conditions.

4.6.1 Setting

For the purpose of this analysis, the WSIP study area has been defined as comprising the areas directly affected by proposed projects and their immediate surroundings. The WSIP projects would be within the San Joaquin and Bay Area Delta ecological regions, two of the 10 ecological regions identified in California as part of a program to conserve biodiversity.[2] The San Joaquin ecological region has the highest concentration of endangered plants and animals of the two ecological regions crossed by WSIP projects. However, this ecological region—originally a vast mosaic of marshes, lakes, rivers, and uplands—has been substantially altered — even the most common elements (such as perennial grasses) have been replaced by Mediterranean annuals. The Bay Area Delta ecological region, adjacent to the San Joaquin Valley at a zone of overlap in the distribution of Northern and Southern California plants and animals, is the second most important region.

1 Several species known or that may occur on or in the program area are accorded "key special status" because of their recognized rarity or vulnerability to various causes of habitat loss or population decline. Some of these species receive specific protection defined in federal or state endangered species legislation, but others have been designated as key special-status species on the basis of expertise of state resource agencies or other organizations.

2 In 1991, a Biodiversity Memorandum of Understanding was signed by major federal and state agencies, with the intent of promoting interagency cooperation in conserving biodiversity across administrative boundaries. As part of this conservation strategy, California was divided into 10 ecological regions that are defined mainly by physical features, such as soils, topography, and climate, and by the distribution patterns of plants and animals.

Vegetation mapping developed for the 2005 California Gap Analysis Project (GAP),[3] conducted by the US Geological Survey, was used to compile **Figure 4.6-1** for the WSIP study area (California Gap Analysis Project, 2007). Vegetation groupings are reported as Wildlife Habitat Relationship (WHR) types, or habitat types (Mayer and Laudenslayer, 1988). WHR types are more useful when evaluating plant and animal resources simultaneously.

The setting discussion for each region describes the WHR habitat types as well as the sensitive natural communities known to occur within the WSIP study area. A natural community is a subset of a habitat type, with more or less consistent plant species composition, structure, and physical conditions. Of the roughly 375 natural communities defined and described by Holland (1986), about 125 are considered "sensitive" by the California Natural Diversity Database (CNDDB) because of their rarity in California. Sensitive natural communities often support key special-status species and are therefore a useful filter for identifying sensitive biological resources at the program level of analysis. Separate, project-level CEQA review will present detailed discussions of sensitive natural communities based on further field investigation and more refined project descriptions for the WSIP projects.

This setting discussion also identifies species considered to be key special-status species. In addition to state- and federally listed species, four other species have been included based on input from state resource agencies or other organizations. Western burrowing owl (*Athene cunicularia hypugaea*) is included in this analysis because it has been the subject of two recent listing petitions. Foothill yellow-legged frog (*Rana boylii*), a California species of special concern,[4] has been identified by the CDFG as a species deserving special attention in the Alameda Creek watershed. Finally, the Alameda Creek watershed's population of rainbow trout (*Oncorhynchus mykiss*) is also considered.[5] Because there are impassable barriers to fish migration in lower Alameda Creek, the National Marine Fisheries Service (NMFS) considers the population in Alameda Creek to be rainbow trout rather than steelhead (Federal Register, 2005a). In general, the key special-status species discussed in this analysis occupy sensitive habitats, and many are associated with other species of concern.[6] Together with the sensitive natural communities, key special-status species are used in this PEIR as indicators of the nature and extent of impacts on sensitive biological resources.

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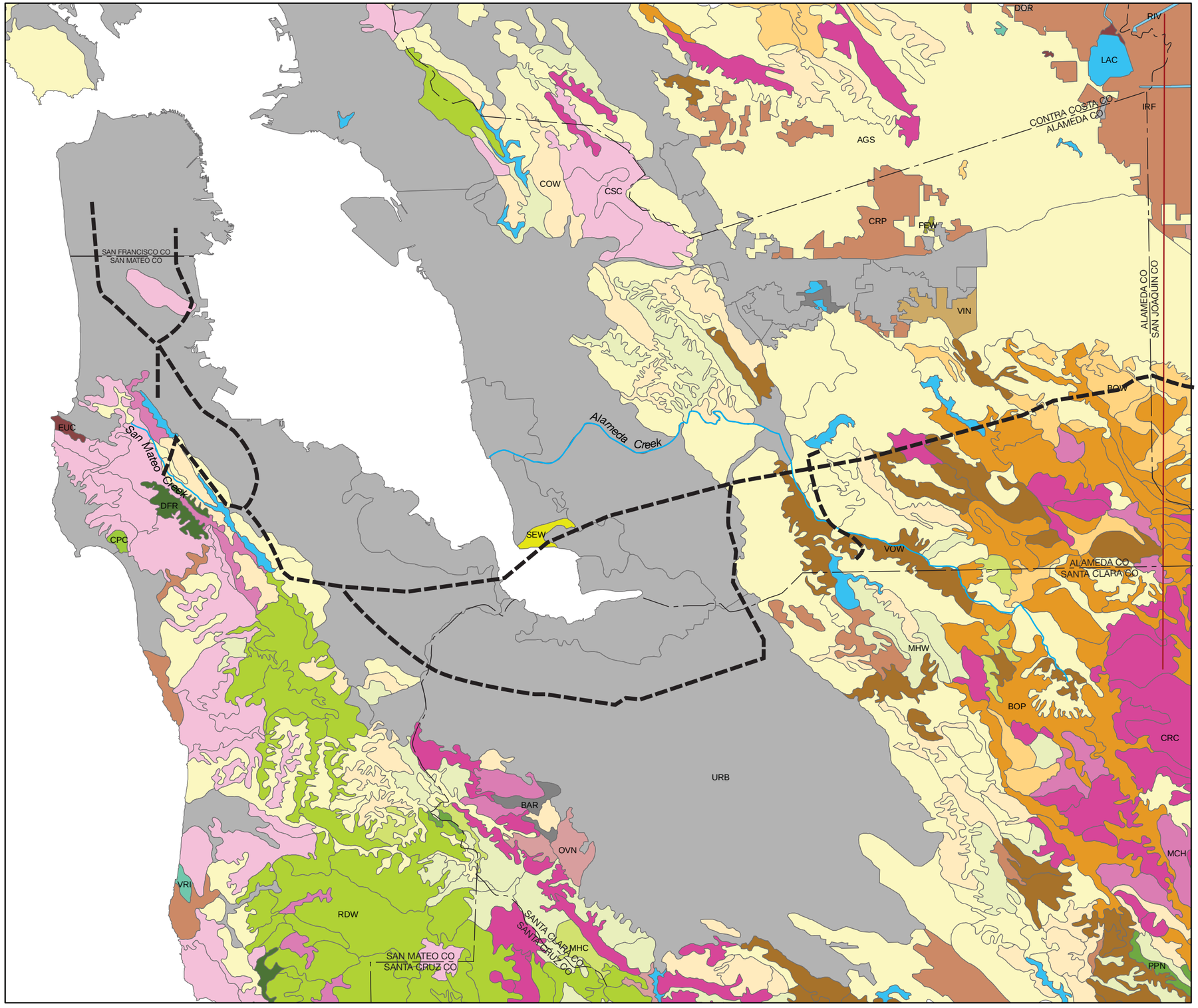
3 GAP provides regional assessments of the conservation status of native vertebrate species and natural land cover types and facilitates the application of this information to land management activities. GAP is conducted as state-level projects and is coordinated by the U.S. Geological Survey Biological Resources Division.

4 "California species of special concern" is a list of animal species maintained by the California Department of Fish and Game to identify animal species whose populations have declined in California and whose breeding populations are at risk of extirpation (local extinction) in California. Species on this list have no legal protection under the California Endangered Species Act.

5 Rainbow trout and steelhead are the same species of trout (*Oncorhynchus mykiss*). Rainbow trout spend their whole life in freshwater; steelhead spend much of their life in the ocean but return to freshwater to spawn. Alameda Creek historically supported a run of steelhead, but impassable barriers have prevented steelhead from returning to spawn.

6 "Other species of concern," defined in this PEIR as U.S. Fish and Wildlife Service (USFWS) candidate species, California Department of Fish and Game (CDFG) species of special concern, and California Native Plant Society (CNPS) List 1A, 1B, and List 2 species, are too numerous and site-specific to identify at the program level; however, most of these additional species are associated with the sensitive habitats addressed in this section. "Other species of concern" are evaluated in Chapter 5 for those WSIP elements that would not receive further CEQA analysis.



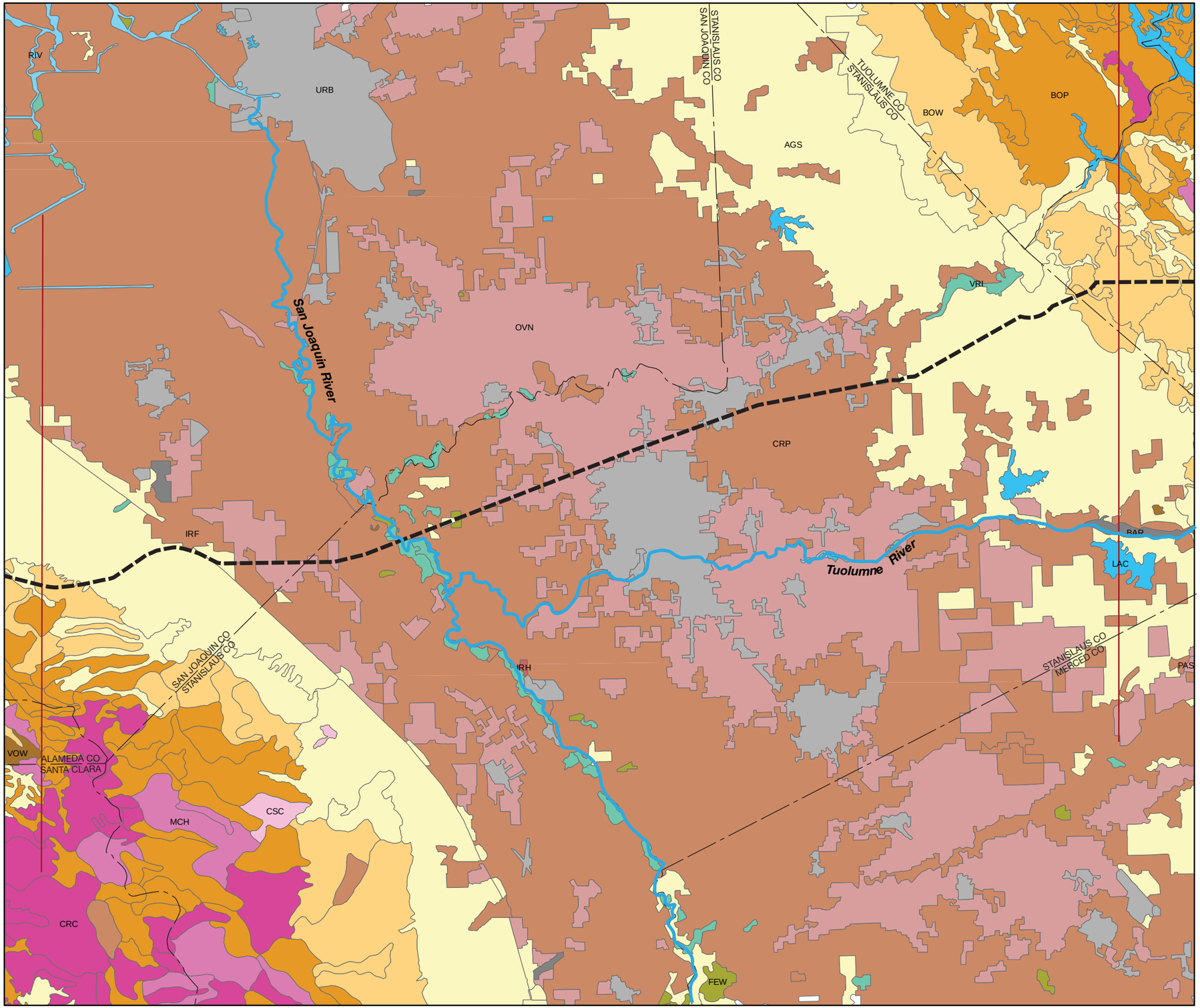
- URB Urban
- BAR Barren
- OVN Orchard and Vineyard
- DOR Deciduous Orchard
- VIN Vineyard
- CRP Cropland
- IRF Irrigated Row and Field Crops
- EUC Eucalyptus
- RIV Riverine
- LAC Lacustrine
- CSC Coastal Scrub
- MCH Mixed Chaparral
- CRC Chamise-Redshank Chaparral
- AGS Annual Grassland
- SEW Saline Emergent Wetland
- FEW Freshwater Emergent Wetland
- VRI Valley-Foothill Riparian
- COW Coastal Oak Woodland
- VOW Valley Oak Woodland
- BOW Blue Oak Woodland
- BOP Blue Oak-Foothill Pine
- MHW Montane Hardwood
- MHC Montane Hardwood-Conifer
- RDW Redwood
- CPC Closed-Cone Pine-Cypress
- PPN Ponderosa Pine
- DFR Douglas-Fir

Existing System Corridor

0 5
Miles

SOURCE: California Gap Analysis Project, 2005

Figure 4.6-1a
Habitat Types in the WSIP Study Area



California Wildlife Habitat Relationship Habitat Types

WHR_name

- URB Urban
- BAR Barren
- OVN Orchard and Vineyard
- DOR Deciduous Orchard
- CRP Cropland
- IRH Irrigated Hayfield
- IRF Irrigated Row and Field Crops
- PAS Pasture
- RIV Riverine
- LAC Lacustrine
- CSC Coastal Scrub
- MCH Mixed Chaparral
- CRC Chamise-Redshank Chaparral
- AGS Annual Grassland
- FEW Freshwater Emergent Wetland
- VRI Valley-Foothill Riparian
- VOW Valley Oak Woodland
- BOW Blue Oak Woodland
- BOP Blue Oak-Foothill Pine

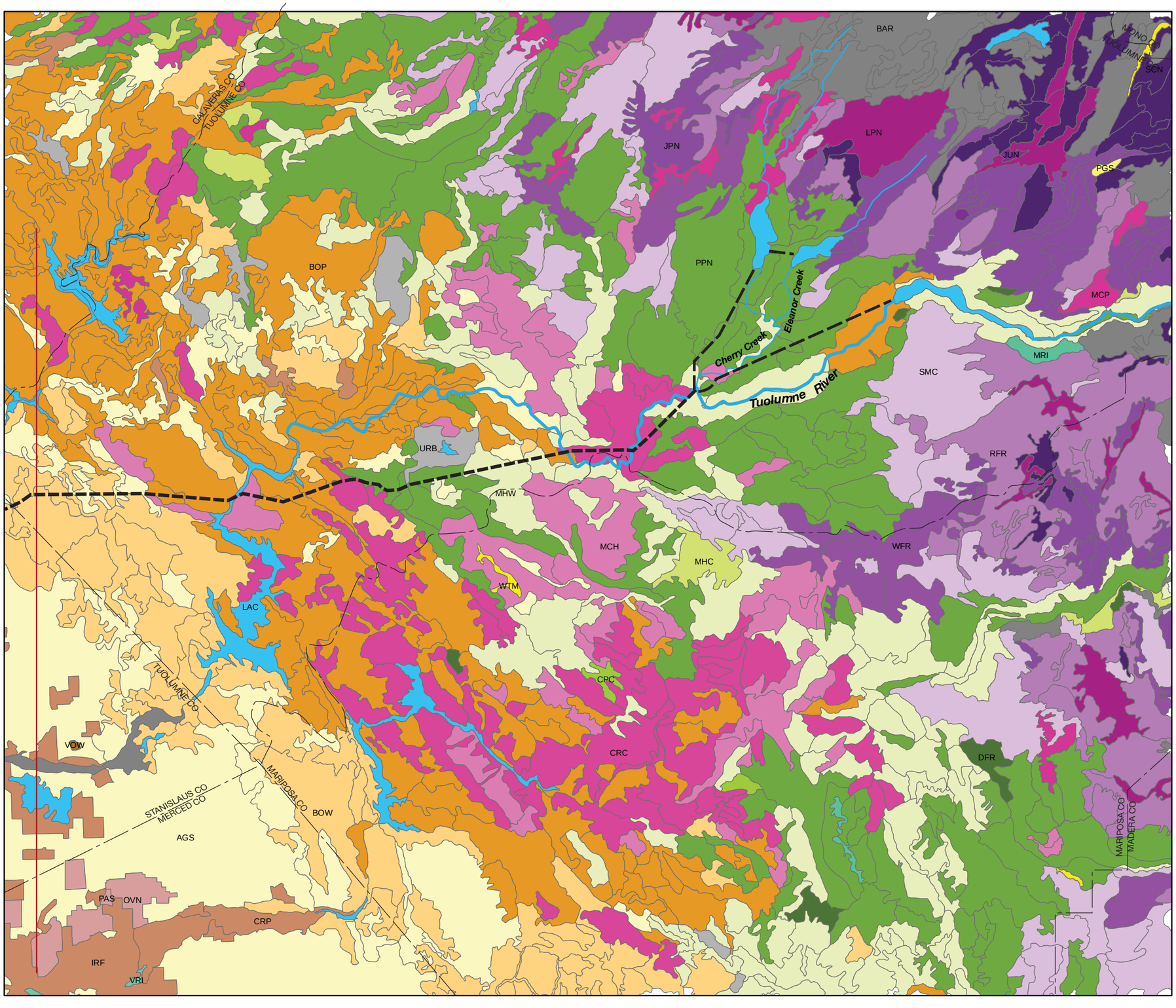
Existing System Corridor

0 5
Miles

SOURCE: California Gap Analysis Project, 2005

SFPUC Water System Improvement Program . 203287

Figure 4.6-1b
Habitat Types in the WSIP Study Area



California Wildlife Habitat Relationship Habitat Types

WHR_name

- URB Urban
- BAR Barren
- OVN Orchard and Vineyard
- CRP Cropland
- IRF Irrigated Row and Field Crops
- PAS Pasture
- LAC Lacustrine
- MCH Mixed Chaparral
- CRC Chamise-Redshank Chaparral
- MCP Montane Chaparral
- AGS Annual Grassland
- PGS Perennial Grassland
- WTM Wet Meadow
- VRI Valley-Foothill Riparian
- MRI Montane Riparian
- VOW Valley Oak Woodland
- BOW Blue Oak Woodland
- BOP Blue Oak-Foothill Pine
- MHW Montane Hardwood
- MHC Montane Hardwood-Conifer
- CPC Closed-Cone Pine-Cypress
- PPN Ponderosa Pine
- DFR Douglas-Fir
- SMC Sierran Mixed Conifer
- RFR Red Fir
- WFR White Fir
- JPN Jeffrey Pine
- JUN Juniper
- LPN Lodgepole Pine
- SCN Subalpine Conifer

Existing System Corridor

0 5
Miles

SOURCE: California Gap Analysis Project, 2005

SFPUC Water System Improvement Program . 203287

Figure 4.6-1c
Habitat Types in the WSIP Study Area

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As noted above, project-level environmental review will address the full suite of species that must be assessed under CEQA—that is, candidates for listing, rare and endangered plants, federal species of concern, California species of special concern, and California fully protected species. Special-status fish species that could be affected by construction of specific WSIP projects are described in this section, but are discussed in more detail in the fisheries sections of Chapter 5 (Sections 5.3.6, 5.4.5, and 5.5.5), which addresses WSIP impacts related to the proposed water supply and system operations.

San Joaquin Region

Habitats

This region includes the area crossed by the Hetch Hetchy Aqueduct between Oakdale Portal and the Telsa Portal. Over 50 percent of this corridor has been altered by human development; it includes 34 percent cropland,28 percent orchard and vineyard, and 6 percent urban uses. Prevalent or important natural habitats are discussed below.

Annual Grassland (23%)

Introduced annual grasses are the dominant plant species in this habitat. Annual grassland habitats are open grasslands composed primarily of annual plant species. Many of these species also occur as understory plants in valley oak woodland and other habitats. Structure in annual grassland depends largely on weather and livestock grazing patterns. Dramatic differences in plant growth, both among seasons and among years, are characteristic of this habitat. Fall rains lead to the germination of annual plant seeds. Plants grow slowly during the cool winter months, remaining low in stature until spring, when temperatures increase and stimulate more rapid growth (Mayer and Laudenslayer, 1988). Annual grasslands are found primarily in the eastern and western portion of the San Joaquin Region, on the foothills, lower terraces, and periphery of the valley floor. In areas with soils underlain by a slowly pervious hardpan or claypan, annual grasslands are often associated with vernal pools, a sensitive natural community. Remnant alkali meadows, also a sensitive natural community, are present on floodplains near the San Joaquin River. These resources are too small to map at the program level and thus are included in this habitat type.

Blue Oak Woodland (6%)

Generally, blue oak woodland has an overstory of scattered trees, although the canopy can be nearly closed on more fertile sites. The canopy is dominated by broad-leaved trees that are 16 to 50 feet tall, commonly forming open stands on dry ridges and gentle slopes. Blue oak (*Quercus douglasii*) is the dominant species, constituting 85 to 100 percent of the trees. Typical understory is similar to that of annual grassland (Mayer and Laudenslayer, 1988). In this region, blue oak woodland is found in rolling terrain on the Sierra Nevada and Coast Range foothills at elevations above annual grasslands and below chaparral, woodland, and forest habitats.

Valley Foothill Riparian, Freshwater Emergent Wetlands, and Aquatic Habitats (3%)

The canopy height of valley foothill riparian vegetation is approximately 100 feet in a mature riparian forest, with a canopy cover of 20 to 80 percent. Most trees are winter-deciduous. There is

a subcanopy tree layer and an understory shrub layer. Herbaceous vegetation constitutes about 1 percent of the cover, except in openings where tall herbs and shade-tolerant grasses are present. Generally, the understory is impenetrable and includes fallen limbs and other debris. Dominant species in the canopy layer are Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), and valley oak (*Quercus lobata*). Subcanopy trees are white alder (*Alnus rhombifolia*), box-elder (*Acer negundo* var. *californica*), and Oregon ash (*Fraxinus latifolia*). Riparian vegetation occurs along perennial watercourses that drain the San Joaquin Region, such as the San Joaquin River and its tributaries. Riparian vegetation is also seen along canals and ditches, although its development is generally limited by maintenance practices. Riparian, wetland, and aquatic habitats are the most productive and diverse of California's habitats, although they have been largely eliminated due to agriculture and urbanization, especially in the San Joaquin Region. For example, less than 2 percent of valley foothill riparian habitats remain in the Central Valley of California (Smith, 1980).

Freshwater emergent wetlands are characterized by erect, perennial herbs and grass-like plants with special adaptations to permanent or seasonal flooding. The term "emergent wetland" refers to the vegetation growing out of flooded soils. The vegetation may vary in extent from a few square feet to vast areas covering several square miles. The acreage of freshwater emergent wetlands in California has decreased dramatically since the turn of the century, especially in this region, due to drainage and conversion to other uses, primarily agriculture (Mayer and Laudenslayer, 1988). Extremely small remnant examples of freshwater emergent vegetation are associated with the San Joaquin River and other waterways.

Aquatic habitat includes perennial and seasonal streams, seasonal wetlands, vernal pools, natural ponds and lakes, and reservoirs, including stock ponds. Aquatic habitat throughout the Central Valley, and especially in the San Joaquin River watershed, has been greatly modified since the arrival of Europeans. Formerly vast marshes and riparian areas were cleared, drained, and otherwise modified for increasingly intensive agricultural operations, urbanization, and water storage and distribution projects. The resulting changes in aquatic habitat and water quality conditions (e.g., reduced or lost summer flows in many areas, elevated temperatures, increased turbidity, altered sediment transport, and the runoff or discharge of water containing pesticides, fertilizers, and animal or human wastes) reduced the available habitat suitable for native aquatic species while improving conditions for non-native species, many of which were deliberately or inadvertently introduced to the system, often to the further detriment of native species. Seasonal wetlands, ephemeral or seasonal streams, vernal pools, and stock ponds are located primarily in annual grasslands, mostly at the eastern and western sides of the San Joaquin Region.

Sensitive Natural Communities

Sensitive natural communities in the San Joaquin Region are found in areas of extensive natural habitat, such as the eastern and western foothills of the San Joaquin Valley, and near the San Joaquin River and its floodplain. The sensitive natural communities known to occur in this region and a brief description of known or potential distribution within the WSIP study area are provided below.

Valley needlegrass grassland and pine bluegrass grassland. Small areas dominated by purple needlegrass (*Nassella pulchra*) or pine bluegrass (*Poa secunda*) may occur in the lower Sierra Nevada foothills and Inner Coast Ranges, respectively, generally in areas with relatively thin soils, steep slopes, and historically limited livestock influence.

Northern hardpan vernal pool. This sensitive natural community is known to occur in the rolling grasslands and low terraces between Oakdale Portal and the irrigated pasture on the eastern valley floor.

Alkali meadow. This community is a native-dominated grassland found on alkaline-affected soils such as on the San Joaquin floodplain.

Coastal and valley freshwater marsh. A few natural examples of this formerly extensive community still remain, primarily in the vicinity of the San Joaquin River.

Great Valley cottonwood riparian forest, Great Valley mixed riparian forest, Great Valley valley oak riparian forest, Great Valley willow scrub, and Great Valley elderberry scrub. These riparian natural communities are associated with permanent water. The most extensive natural examples in the WSIP study area are along the San Joaquin and Tuolumne Rivers, although these communities may also be found along smaller perennial streams and along canals and other artificial waterways in the Central Valley.

Key Special-Status Species in the San Joaquin Region

Invertebrates

Vernal pool fairy shrimp (*Branchinecta lynchi*) is a federal threatened species typically found in vernal pools (winter rain pools formed over impervious or slowly permeable soils) and valley grassland drainage swales (areas where winter rain collects but does not stand as long as in vernal pools). This aquatic invertebrate is also found in unvegetated areas with pooled water. Of the listed vernal pool invertebrates, vernal pool fairy shrimp has the largest distributional range; it is found from southern Oregon to Southern California, but primarily in the Sacramento and San Joaquin Valleys.

Conservancy fairy shrimp (*Branchinecta conservatio*) is a federal endangered species found in large, turbid pools as well as in swales formed by old, braided alluvium that fill with winter rains. It ranges from the northern Sacramento Valley through the western San Joaquin Valley and into the South Coast of California.

Vernal pool tadpole shrimp (*Lepidurus packardi*) is a federal endangered species that shares the same habitat as vernal pool fairy shrimp. It ranges from the northern and central Sacramento Valley to the northern half of the San Joaquin Valley and the southern San Francisco Bay.

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is a federal threatened species. During the springtime, adult Valley elderberry longhorn beetles feed and lay eggs on blue elderberry (*Sambucus mexicana*) shrubs found within riparian habitat in the San Joaquin

Valley. It ranges from Red Bluff southward to Tulare or Kern County in the Central Valley, and from the valley floor to elevations as high as 2,200 feet (Barr, 1991). The only critical habitat designated for Valley elderberry longhorn beetle is in Sacramento County, along the Sacramento and American Rivers (Federal Register, 1980).

Program Area Occurrence. The best natural habitat along the Hetch Hetchy Aqueduct for the three key special-status crustaceans (vernal pool fairy shrimp, Conservancy fairy shrimp, and vernal pool tadpole shrimp) occurs in two areas: the low, rolling grasslands on the east side of the program area between Oakdale Portal and the irrigated pastures on the valley floor, and the alkaline grasslands near the San Joaquin River. There is critical habitat for vernal pool fairy shrimp (Unit 14A) in the alkaline grasslands of the San Joaquin River floodplain immediately south of the Hetch Hetchy Aqueduct (Federal Register, 2005b). Critical habitat for the Conservancy fairy shrimp in the San Joaquin Region (Unit 5) is located in the alkaline grasslands north of Highway 132 and west of Gates Road in Stanislaus County. Critical habitat for vernal pool tadpole shrimp in the San Joaquin Region (Unit 13) is situated at the lower edge of the rolling grasslands south of Claribel Road and adjacent to Tim Bell Road to the west of Oakdale Portal in Stanislaus County (Federal Register, 2005b).[7] Although their natural habitat is vernal pools and swales, these species could be found in the program area wherever water ponds for extended periods of time, including in manmade depressions. As a result, these species are considered potentially present throughout their range.

Valley elderberry longhorn beetle could be present anywhere that supports blue elderberry between Oakdale Portal and Tesla Portal, excluding leveled agricultural fields and developed areas.

Fishes

Chinook salmon (*Oncorhynchus tshawytscha*) is an anadromous[8] fish with populations that spawn at different times of year; the Central Valley fall- and late fall-run population is a federal species of concern (69 FR 73:19975). In the Central Valley, all designated critical habitat for the Chinook is in the Sacramento River watershed, not the San Joaquin River (CDFG, 2007). Chinook salmon spawn only once in their lifetime, and the resulting young swim to the ocean in their first months of life.

Central Valley Distinct Population Segment (DPS) steelhead (*Oncorhynchus mykiss*) is a federal threatened anadromous species historically known to occur within all of the major streams in the Central Valley. Steelhead Central Valley DPS critical habitat includes the San Joaquin River to the Tuolumne River, and the Tuolumne River to La Grange Dam (CDFG, 2007). Like Chinook salmon, steelhead live most of their lives in the ocean and return to freshwater to spawn.

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7 From time to time, the USFWS revises the boundaries of critical habitats, and several such revisions were published for vernal pool invertebrates prior to 2007. As a result, the critical habitat boundaries described here may differ from current boundaries at the time of this reading, and may also differ slightly from those shown on Figure 4.6-2, which was prepared at a later time. This information should be considered as guidance for resource analysis; definitive analysis would be performed during preparation of project-level CEQA review.

8 Anadromous fish hatch (rear) in freshwater, migrate to the ocean (saltwater) to grow and mature, and migrate back to freshwater to reproduce.

Unlike Chinook salmon, steelhead are capable of spawning more than once. Young steelhead live in freshwater for their first year or more before migrating to the ocean.

Rainbow trout (*Oncorhynchus mykiss*) is the resident, stream-dwelling form of steelhead. When present in landlocked streams, rainbow trout are considered a distinct population segment (DPS). Currently, they are not part of the Central Valley DPS and thus have no federal or state protection status in the program area (NMFS, 2006).

Green sturgeon (*Acipenser medirostris*) is a bottom-feeding fish that lives in marine and estuarine waters but spawns in freshwater. It is a large, olive-green, bony-plated fish. Water flow is one of the key determinants of larval survival. Juveniles migrate downstream to estuaries, where they live and grow for some time before migrating to the ocean. The Southern DPS is federally listed as threatened (Federal Register, 2006a).

Program Area Occurrence. A wild run of Chinook salmon still exists in the Tuolumne River, but the steelhead run has dwindled, in part due to its requirement for year-round suitable conditions in the river. Efforts are underway to restore both runs, and are focused on the Chinook run in particular. The San Joaquin River and the Tuolumne River up to La Grange Dam are critical habitat for the steelhead Central Valley DPS (CDFG, 2007a; Federal Register, 2006a; CDFG, 2007).Green sturgeon is assumed to have used the main stem of the San Joaquin River for spawning as far south as the confluence with the Tuolumne River. No critical habitat is present in the program area for green sturgeon or Chinook salmon.

Amphibians and Reptiles

California red-legged frog (*Rana aurora draytonii*) is a federal threatened species known or expected to occur in association with stream crossings. Preferred habitat is permanent water (ponded water or slow-moving streams) with densely vegetated shorelines.

California tiger salamander (*Ambystoma californiense*), an inhabitant of annual grasslands, breeds and lays eggs in vernal pools and other temporary ponds (Zeiner et al., 1988). Recently listed as threatened at the federal level and a California species of special concern, California tiger salamander can be found seeking refuge in grassland burrows during most of the year. In the rainy season, tiger salamanders migrate to and breed in temporary ponds. Their summer retreats may be up to one-quarter mile from their winter breeding pools.

Program Area Occurrence. The most likely range for California red-legged frog is west of the California Aqueduct. No critical habitat has been designated for this species in the San Joaquin Region (Federal Register, 2006b). The historical range for California tiger salamander covers the entire San Joaquin Region, from Oakdale Portal to Tesla Portal. The species is now known to occur primarily in the eastern grasslands in the San Joaquin Region, where it breeds in vernal pools and stock ponds. Historical records indicate that this species was known to be present within the Tuolumne River floodplain as well as the rolling grasslands to the north and south. Critical habitat for California tiger salamander has been designated in Stanislaus County just north of the Stanislaus River near Oakdale (Unit 7) and south of Highway 132 in Stanislaus

County (Unit 8). The highest quality natural habitat for this species is natural grasslands that contain large vernal pools, such as those found in the eastern grasslands; however, populations may persist in irrigated pasture and orchards where there is sufficient ponded water for breeding.

Birds

Swainson's hawk (*Buteo swainsoni*), a state threatened species, hunts for small mammals and insects in the grasslands of the San Joaquin Valley. Mature trees (such as oaks) surrounded by large open areas provide nesting habitat. Swainson's hawk nests in the valley are frequently found in riparian areas adjacent to grasslands, grazing lands, and some croplands. Breeding occurs from late March through late August.

Western burrowing owl (*Athene cunicularia hypugaea*), a federal species of concern and California species of special concern, inhabits grasslands as well as disturbed or bermed areas. Burrowing owl is included in this analysis because recent evaluations of its status suggest the species may be a candidate for state or federal listing in the near future. These owls utilize the burrows of ground-dwelling mammals, in particular California ground squirrel (*Spermophilus beecheyi*). Breeding occurs from February through August, with a peak in April and May.

Least Bell's vireo (*Vireo belli pusillus*) is listed as endangered at both the state and federal levels. It inhabits riparian brush, where it feeds on insects and nests in dense vegetation within a meter of the ground. This species winters in Baja California and migrates to central and coastal California to breed. Least Bell's vireo was formerly widespread in riparian habitats in the Central Valley; the species has been considered extinct from the valley until recent years, but anecdotal reports suggest it may have returned. Least Bell's vireo has high site fidelity (i.e., individuals return to nest in the same territory and often in the same shrub). Nesting can extend from late March to August.

Program Area Occurrence. Swainson's hawk is opportunistic in its foraging and could be found virtually anywhere. Nesting is more restricted, but could occur anywhere along the Hetch Hetchy Aqueduct where large trees are present. Swainson's hawks can nest in riparian forest or in isolated trees near agricultural fields. This species has been reported as nesting in large trees in some of the older sections of large San Joaquin Valley cities. Western burrowing owl is also opportunistic in its foraging habits and can be found in agricultural fields as well as grasslands throughout the program area. The species can persist at the edges of plowed fields and along the banks of canals. Since the USFWS has not listed these two species, no critical habitat has been designated for them. A recent sighting of Least Bell's vireo at the San Joaquin River National Wildlife Refuge has confirmed its presence in the Central Valley.

Mammals

San Joaquin kit fox (*Vulpes macrotis mutica*), a federal endangered and state threatened species, primarily inhabits annual grassland habitat on flat terrain. San Joaquin kit foxes usually construct dens in loose soils, often enlarging the dens or burrows of other species. Evidence of den use includes the presence of scat, prey remains, tracks, or matted vegetation at the entrance. However,

evidence of den use is not always readily apparent. Kit foxes are born in late February or early March and will venture from the dens by late March. Young of the year generally disperse by October, when family groups begin to split up.

The **riparian, or San Joaquin, woodrat** (*Neotoma fuscipes riparia*) is a federal endangered species closely associated with large rivers in the San Joaquin Valley. Its habitat is dense riparian vegetation with a mix of brush and trees, with trees, snags, and logs for nesting. Riparian woodrats live in loosely cooperative societies, building large stick houses in dense brush such as willow thickets. They are mostly nocturnal and feed on plant material such as flower buds, young shoots, nuts, and fungi.

Program Area Occurrence. Currently, San Joaquin kit fox is primarily present in the remaining native valley and foothill grasslands and saltbush scrub communities of the valley floor and surrounding foothills (Endangered Species Recovery Program, 2007). The only potentially suitable habitat for riparian woodrat in the program area is along the San Joaquin River. No critical habitat has been designated for either San Joaquin kit fox or the riparian woodrat.

Vernal Pool Plants

Vernal pools are seasonal wetlands formed in gently undulating or rolling topography where the soil is underlain by a slowly permeable subsoil layer. The extreme conditions of ponding in the winter and complete drying in the summer have given rise to many species that are adapted to these conditions, and further new species have evolved in response to specific conditions of soil texture, chemistry, and length of inundation. Many of the key special-status vernal pool plants are closely associated with specific soil types. The physical conditions necessary for vernal pools are permanently altered when the subsoil layer is disturbed, so vernal pools persist mainly on the uncultivated terrace soils peripheral to the valley floor.

Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*), a federal endangered, state endangered, and CNPS List 1B plant species, occurs on somewhat acid, gravelly loams such as Pentz and Redding soils. **Hoover's spurge** (*Chamaesyce hooveri*), a federal threatened and CNPS List 1B species, occurs on large and relatively deep, clay-lined vernal pools. Four related grass species, **Colusa grass** (*Neostapfia colusana*), **San Joaquin Valley Orcutt grass** (*Orcuttia inaequalis*), **hairy Orcutt grass** (*Orcuttia pilosa*), and **Greene's tuctoria** (*Tuctoria greenei*), are CNPS List 1B and both federally and state-listed species. These species are typically found in the larger and deeper vernal pools on the terrace soils on the east side of the San Joaquin Valley.

Program Area Occurrence. The grasslands in the eastern portion of the valley contain vernal pools on the somewhat acid soils of the Keyes-Pentz-Peters association—habitat consistent with that of several key special-status vernal pool plants. The largest and deepest vernal pools are the most likely to support rare vernal pool plants. Critical habitat has been designated for all six of these plants. Critical habitat units for five of the species are located at or near the Hetch Hetchy Aqueduct, primarily in Stanislaus County. Unit 2A for succulent owl's-clover extends from Highway 132 north to Rock River Road and Warnerville Road, just south of the aqueduct. Unit 4A for Hoover's spurge also occupies a large area of rolling grasslands from Highway 132

north to Rock River Road and Warnerville Road. Unit 4A for Colusa grass extends both to the north and south of Willms Road near the Tuolumne-Stanislaus County line; Unit 4B lies to the south of Claribel Road, south of the aqueduct, and Units 4D and 4E occupy the large area of rolling grasslands from Highway 132 north to Warnerville Road. Units 4A and 4B for hairy Orcutt grass are located south of Highway 132 and the Tuolumne River. Unit 6D for Greene's tuctoria is located in eastern Stanislaus County south of Rock River Road, and Unit 6E is located on the western edge of Tuolumne County on both sides of Highway 120 (Federal Register, 2005b).

Grassland Plants

Large-flowered fiddleneck (*Amsinckia grandiflora*), a state endangered, federal endangered, and CNPS List 1B annual plant, grows in grasslands on deep loamy soils, typically on northern slopes of the Inner Coast Ranges. Its historical distribution was from Antioch to northern San Joaquin County, but the species is currently restricted to three natural populations in Corral Hollow and one introduced population at Black Diamond Mines Regional Park.

Program Area Occurrence. In Corral Hollow, there are two natural populations of large-flowered fiddleneck at Lawrence Livermore National Laboratory's Site 300 and one on private land. The population on private land is the largest and the most recently discovered, suggesting that additional populations could exist in the area. The Lawrence Livermore project (SJ-2), at the Thomas and Mocho Shafts and their access roads, is located in an area that could be suitable habitat for this species. Although not strictly located within the San Joaquin Region, large-flowered fiddleneck is included in this discussion because of its close association with Tesla Portal. Critical habitat has been designated for large-flowered fiddleneck and consists of 160 acres at Lawrence Livermore Laboratory's Site 300 in Corral Hollow (Federal Register, 1985).

Riparian Plants

Delta button-celery (*Eryngium racemosum*), a state endangered, CNPS List 1B plant, grows in clay depressions in riparian scrub. It is geographically restricted to the floodplains of large rivers in the area from San Joaquin County to Merced County.

Program Area Occurrence. There are two CNDDB records for Delta button-celery at Caswell State Park and one in the city of San Joaquin, about three miles north of the Hetch Hetchy Aqueduct as it crosses the San Joaquin River. If any suitable habitat is present, it would be near the San Joaquin River. No critical habitat is designated for this species.

Sunol Valley, Bay Division, Peninsula, and San Francisco Regions

Habitats

The Sunol Valley, Bay Division, Peninsula, and San Francisco Regions support some of the same habitats already described for the San Joaquin Region, including annual grassland (15 percent) and blue oak woodland (5 percent). In addition, these regions contain coastal oak woodland (6 percent), valley oak woodland (2 percent), coastal scrub (1 percent), riparian and aquatic habitats (less than 1 percent), and saline emergent wetland (1 percent). Blue oak woodland was

described in the preceding section; its occurrence in these regions is limited to the Inner Coast Ranges, primarily east of the Sunol Valley. The other habitat types are described below. Many occurrences of habitat types are interspersed, but are too small to map at the program level. Due to the large number of key special-status species known to occur in the Bay Area, and the extent of habitat conversion to urban and agricultural land uses that has taken place, even small areas of natural habitat may have high ecological importance.

Annual Grassland (15%)

As noted in the preceding section, annual grasslands are non-native-dominated but support a variety of native annual and perennial grasses and broadleaf plants. Under some harsh site conditions, such as very dry, steep, or infertile soils, native species still predominate. Examples of these habitats are serpentine grasslands, valley needlegrass grassland, and wildflower fields, all of which are considered sensitive natural communities (see discussion under Sensitive Natural Communities, below). Most remnant examples of these communities are too small to map at the program level, but would be identified (and potential impacts addressed) at the project level. Some native grasslands, including purple needlegrass grassland and potential serpentine grassland, are located to the east, west, and north of Calaveras Reservoir in the Sunol Valley (SFPUC, 2001).

Coastal Oak Woodland (6%)

Coastal oak woodland is extremely variable. In the program area, this habitat type consists of an open- to closed-canopy overstory primary made up of evergreen hardwoods, such as coast live oak (*Quercus agrifolia*) and California bay (*Umbellularia californica*), that are 15 to 70 feet tall. The understory is also variable; it can consist of shrubs from adjacent scrub or chaparral, or shrubs scattered among and under trees. Where trees form a dense canopy, the understory can be a lush cover of shade-tolerant shrubs and herbs or a sparse cover with a thick layer of leaf litter (Mayer and Laudenslayer, 1988). Coastal oak woodland is found on moderate slopes and sometimes near watercourses in the Sunol Valley, Peninsula, and San Francisco Regions.

Valley Oak Woodland (2%)

Valley oak woodland varies from savanna-like to forest-like stands of trees with partially closed canopies, comprised mostly of winter-deciduous, broad-leaved species. Denser stands typically grow in valley soils along natural drainages. Similarly, the shrub layer is best developed on deep soils near drainages, becoming insignificant in the uplands with the sparser stands of trees. In these locations, the herbaceous understory resembles annual grassland. In most situations, the canopy of valley oak woodland consists almost exclusively of valley oaks. Mature trees with well-developed crowns range in height from 50 to 115 feet (Mayer and Laudenslayer, 1988). Because valley oak woodland is typically found on deep soils on gentle slopes, most has been urbanized. Narrow bands of valley oaks are often associated with watercourses in all three regions, but the Sunol Valley still supports extensive stands of valley oak woodland on the valley floor.

Coastal Scrub (1%)

The structure of coastal scrub ranges from low- to moderate-height shrubs with generally small leaves, flexible branches, semiwoody stems growing from a woody base, and a shallow root system. In the program area, mature coastal scrub consists of a nearly closed canopy of dense shrubs about 7 feet tall with a limited herbaceous layer growing in the openings. Bare zones about 3 feet wide may extend from stands dominated by coastal sage (*Artemisia californica*) into surrounding annual grasslands (Mayer and Laudenslayer, 1988). Most of the coastal scrub in the program area is located on steep, rocky slopes above the Sunol Valley, but some also occurs on steep, rocky slopes in the Peninsula and San Francisco Regions, such as in San Mateo Creek Canyon.

Valley Foothill Riparian and Aquatic Habitats (1%)

These habitat types are extremely rare and have been diminished in the Sunol Valley, Bay Division, Peninsula, and San Francisco Regions, but some of the best remaining examples in the Bay Area lie within the Sunol Valley Region. The Sunol Valley supports one of the largest remaining stands of sycamore alluvial woodland in the Bay Area—a widely spaced stand of sycamores in the broad floodplain of Alameda Creek. Well-developed examples of arroyo willow scrub and valley oak forest, and even small examples of alder forest, are found along Alameda Creek and its tributaries in the Sunol Valley as well as along the larger and more natural creeks in the Peninsula and San Francisco Regions, such as San Mateo Creek.

Aquatic habitats include perennial and seasonal streams, seasonal wetlands, vernal pools, natural ponds and lakes, and reservoirs, including stockponds. Stockponds are the main breeding sites for both California tiger salamanders and California red-legged frogs.

South San Francisco Bay is a shallow, mud-bottom estuary, with limited circulation and events of poor water quality during the dry season and following flood flows in the wet season. Numerous factors have greatly modified the ecology of the South Bay, including deposition of vast amounts of sediment, reclamation of tidal wetlands, unregulated harvest of native species, pollution, reduced input of freshwater, and rampant, continuing introductions of non-native species of plants, fish, and invertebrates. Nevertheless, the South Bay still serves as a migration corridor for anadromous fishes such as Chinook salmon and steelhead, and plans are underway to restore stream habitat where possible. One such example is the SFPUC's removal of the Sunol and Niles Dams on Alameda Creek in 2006. The Peninsula and San Francisco Regions represent the most highly altered aquatic habitats of all. Several of the larger streams occupy their natural channels in the Peninsula hills, and then enter culverts as they pass the low-lying areas before emptying into the bay. The SFPUC reservoirs—Upper and Lower Crystal Springs Reservoirs and San Andreas Reservoir—are the largest freshwater bodies. Lake Merced is a smaller lake in western San Francisco.

Saline Emergent Wetland (1%)

The South Bay supports a network of tidal sloughs and salt marshes, and efforts are underway to restore extensive areas of former marshes. Saline emergent wetlands are salt or brackish marshes consisting mostly of perennial herbs and grass-like plants, ranging in height from 0.7 to 7 feet or more, along with algal mats on moist soils and at the base of larger plants. These wetlands occur

above sand and mud flats flooded for long periods with each cycle of the tide, and below upland communities that are not subject to tidal action; they provide food, cover, nesting, and roosting habitat for a variety of birds, mammals, reptiles, and amphibians. These include endemic subspecies of birds such as the endangered California clapper rail (*Rallus longirostris obsoletus*), and mammals such as the salt marsh harvest mouse (*Reithrodontomys raviventris*).

Sensitive Natural Communities

Sensitive natural communities in these regions are concentrated in areas of extensive natural habitat, such as the Sunol Valley, the Peninsula watershed, and various perennial watercourses. The sensitive natural communities known to occur in these regions and a brief description of known distribution within the WSIP study area are provided below. Other sensitive natural communities may also be present, especially in areas of extensive natural vegetation, such as along the margins of San Francisco Bay, the Alameda and Peninsula watersheds, and San Bruno Mountain.

Valley needlegrass grassland and serpentine grassland. Areas dominated by native bunchgrasses occur in grasslands in the Sunol Valley, especially to the north and east of Calaveras Reservoir, on the ridges to the east and west of Upper and Lower Crystal Springs Reservoirs, and on San Bruno Mountain. Those areas on serpentine soils are considered serpentine grassland, while others are simply native bunchgrass-dominated and are considered valley needlegrass grassland.

Alkali meadow. Native-dominated grasslands on alkaline-affected soils are found along the margins of the South Bay, such as at the Don Edwards San Francisco Bay National Wildlife Refuge in Fremont.

Northern coastal salt marsh. This tidal marsh, located around the periphery of San Francisco Bay, is dominated by pickleweed (*Salicornia* spp.). A large amount of this sensitive natural community has been lost to development, and much of the remaining areas have been modified by diking and draining. However, even somewhat degraded examples of northern coastal salt marsh provide habitat for a number of key special-status species that may be found in the vicinity of the Newark and Ravenswood Valve Houses, and in low-lying land near San Bruno Mountain.

Coastal and valley freshwater marsh and freshwater seep. Examples of these natural communities can be found along the perimeter of Calaveras Reservoir and Upper and Lower Crystal Springs Reservoirs, and in areas where there is permanent standing water, such as below Crystal Springs Dam. Freshwater seep communities can be found occasionally in the Peninsula and Alameda watersheds.

Central coast cottonwood-sycamore riparian forest, central coast live oak riparian forest, central coast arroyo willow riparian forest, sycamore alluvial woodland, white alder riparian forest, valley oak riparian forest, and central coast riparian scrub. These riparian natural communities are associated with permanent water. The most extensive natural examples in the WSIP study area are in the Sunol Valley along Alameda Creek and its tributaries, in the

Peninsula watershed along San Mateo Creek and its tributaries. Smaller examples are also found along other permanent streams such as the Guadalupe River and other creeks in the East Bay, South Bay, and Peninsula, although many of these have been highly altered through channelization, urbanization, and vegetation management for flood control.

Key Special-Status Species in the Sunol Valley, Bay Division, Peninsula, and San Francisco Regions

For species already described under the San Joaquin Region, the text below provides only "Program Area Occurrence" information.

Invertebrates

Vernal pool tadpole shrimp. See description in the San Joaquin Region section for status and ecology.

Bay checkerspot butterfly (*Euphydryas editha editha [=E. e. bayensis]*), a federal threatened species, is a medium-sized butterfly with a wingspan of 1 to 2 inches. The black bands along the veins on the upper wing surface contrast sharply with bright red and yellow spots. The black basal coloration gives a checkered appearance. Habitat consists of isolated patches of native grassland on shallow, serpentine-derived or similar soils that support growth of the butterfly's two larval foodplants, annual plantain (*Plantago erecta*) and annual owl's-clover (*Orthocarpus densiflorus*).

Callippe silverspot butterfly (*Speyeria callippe callippe*), a federal endangered species, is a small yellow-orange butterfly with dark markings. There are 16 subspecies of silverspot, of which two are found in the Bay Area. Only the Callippe silverspot subspecies is protected under the Federal Endangered Species Act. The Callippe silverspot larval foodplant is the Johnny-jump-up violet (*Viola pedunculata),* which is generally found in native-dominated grasslands. The adults feed on nectar from several sources, including California buckeye (*Aesculus californica*), coyote mint (*Monardella villosa),* and thistles such as *Cirsium* and *Silybum*.

Program Area Occurrence. Bay checkerspot butterfly is found on serpentine grasslands on San Bruno Mountain and on several ridges east of Upper and Lower Crystal Springs Reservoirs. Surveys for this species have been carried out in the native grasslands around Calaveras Reservoir, but none have been found (Arnold, 2005). Critical habitat for Bay checkerspot butterfly (see the Regulatory and Conservation Planning Framework section, below) is mapped on San Bruno Mountain in the San Francisco Region, extending to the eastern shoulder of the mountain, including a small segment of the Crystal Springs Pipeline No. 2. Another critical habitat unit is located in the Bay Division Region, extending from Edgewood County Park to the west side of Cañada Road, slightly south of the program area. A third unit is located at Stanford University's Jasper Ridge Ecological Reserve, to the southwest of the Bay Division Pipelines Nos. 3 and 4 (Federal Register, 2001).

Callippe silverspot butterfly is found on San Bruno Mountain and at Edgewood County Park. A population of silverspot butterfly similar to the endangered subspecies was observed on the Alameda watershed near Calaveras Reservoir in 2004 (Arnold, 2005). The Alameda watershed

population exhibits characteristics somewhat intermediate between the Callippe silverspot and another subspecies, *S. callippe comstocki*; however, Arnold (2005) concluded that its attributes were sufficiently similar to the Callippe silverspot that it should be treated as such.

A review of the distribution of the vernal pool invertebrates and information from an SFPUC biologist (Stoltz, 2006) indicates that habitat in the Sunol Valley area is considered unsuitable for vernal pool fairy shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp and is somewhat outside the known range for these species. Several recent records exist for vernal pool tadpole shrimp in the alkaline grasslands near the Don Edwards San Francisco Bay National Wildlife Refuge, so this species is considered to be potentially present in the Bay Division Region. Critical Habitat Units 16A and 16B for vernal pool tadpole shrimp are located west of Interstate 880 between Mowry Slough and Mud Slough in the Don Edwards San Francisco Bay National Wildlife Refuge (Federal Register, 2005b), some distance from both the Bay Division Pipelines Nos. 1 and 2 and Bay Division Pipelines Nos. 3 and 4.

Fishes

Chinook salmon. The California Coast DPS Chinook salmon is federally listed as threatened. Chinook salmon spawn only once, and their young migrate to the ocean during their first months of life. The designated critical habitat for this DPS extends only from Eureka to Santa Rosa, but the range of the population includes San Francisco Bay.

Central California Coast DPS steelhead (*Oncorhynchus mykiss*) is federally listed as threatened. Like the Central Valley DPS steelhead, this population segment spawns in streams, then swims to the ocean where it grows and matures, returning to spawn in its natal stream. This DPS is defined as steelhead originating in streams that drain directly into San Francisco and San Pablo Bays, or into the Pacific Ocean along the Central Coast.

Rainbow trout (*Oncorhynchus mykiss*) is the resident, stream-dwelling form of steelhead. When present in landlocked streams, rainbow trout are considered a distinct population segment and are not part of the Central California Coast DPS (NMFS, 2006).

Program Area Occurrence. Chinook salmon of the California Coast DPS have spawned in small numbers in accessible portions of the Guadalupe River in recent years, although this drainage has not been designated as critical habitat. In the Bay Division and Peninsula Regions, Central California Coast DPS steelhead have continued to spawn in accessible reaches of the larger creeks draining into San Francisco Bay as well as the major creeks along the coast that drain into the Pacific Ocean. Critical habitat for the Central California Coast DPS steelhead includes the Guadalupe River, Coyote Creek, and San Francisquito Creek and their tributaries (Federal Register, 2005a).

For many decades, impassible barriers along Alameda Creek have blocked steelhead from entering the upper Alameda Creek watershed in the Sunol Valley to spawn. In 2006, the SFPUC removed two upstream barriers, the Niles and Sunol Dams. However, other barriers, including the

BART weir downstream, continue to block anadromous fish passage. Thus, rainbow trout is the only form of *Oncorhynchus mykiss* present in Alameda Creek within the Sunol Valley Region.

On the coast side of the Peninsula watershed, Central California Coast DPS steelhead spawn in Pilarcitos and San Pedro Creeks, both of which are considered critical habitat for steelhead.

In the Bay Division and Peninsula Regions, Central California Coast DPS steelhead have continued to spawn in accessible reaches of Coyote Creek, Guadalupe River, San Francisquito Creek, Stevens Creek, San Mateo Creek, and smaller seasonal streams. Additionally, Chinook salmon of the California Coastal DPS have spawned in small numbers in accessible portions of the Guadalupe River in recent years.

Amphibians and Reptiles

Foothill yellow-legged frog (*Rana boylii*) is a California species of special concern. It lives in shallow, moving water with riffles and sunny banks. It is always found near water. Populations of this species have been nearly eliminated from the Bay Area. Foothill yellow-legged frog is subject to predation from introduced species, poorly timed fluctuations in water releases from upstream reservoirs, and unfavorable precipitation conditions, all of which have contributed to its ongoing decline in California.

California red-legged frog. See description in the San Joaquin Region section for status and ecology.

California tiger salamander. See description in the San Joaquin Region section for status and ecology.

San Francisco garter snake (*Thamnophis sirtalis tetrataenia)* is a federal and state endangered and California fully protected species most often found in the vicinity of standing water, mainly ponds, lakes, marshes, and sloughs.

Alameda whipsnake (*Mastcophis lateralis euryxanthus)* is a federal and state threatened species that occurs within coastal scrub, woodland, and grassland habitat in the eastern Bay Area. Home ranges are typically centered on areas of scrub habitats with open to partially open canopies, on south-, southeast-, east-, and southwest-facing slopes.

Program Area Occurrence. Healthy populations of foothill yellow-legged frogs are present in the Alameda watershed. California red-legged frog is well distributed in suitable habitat throughout the three regions. Critical Habitat Unit SNM-1A includes much of the Peninsula watershed north of Highway 92 (Federal Register, 2006b). Critical Habitat Unit STC-1A for California red-legged frog has also been designated in Santa Clara County south of Calaveras Reservoir (CDFG, 2007a). California tiger salamander has been reported to occur in pools in the Sunol Valley near the Alameda East and West Portals; however, in the Bay Area it has disappeared from almost all of the lower elevation areas, except for one small site at the Don Pedro San Francisco Bay Wildlife Refuge near Fremont (Goals Project, 2000) and a declining population at Lake Lagunitas at Stanford University. They may extend somewhat further north on the Peninsula. Critical

Habitat Unit 3 for California tiger salamander is located in the Calaveras Creek watershed, between Arroyo Hondo and Calaveras Reservoir.

The largest extant population of San Francisco garter snake is on SFPUC Peninsula watershed lands (USFWS, 1985), in and near most of the Peninsula region projects (PN-1, PN-2, PN-4 and PN-5) and the western terminus of the Bay Division pipeline (BD-1). No critical habitat is designated for this species. The Alameda whipsnake range is restricted to the Inner Coast Ranges in western and central Contra Costa and Alameda Counties (Federal Register, 2005c). Critical Habitat Unit 5B for Alameda whipsnake includes 18,214 acres in the Sunol Valley between Calaveras and San Antonio Reservoirs. This habitat unit therefore includes the southern but not northern part of the Sunol Valley (the New Irvington Tunnel project, SV-4, is outside the designated critical habitat).

Birds

Bald eagle *(Haliaeetus leucocephalus)* is a federal threatened species, but was proposed for delisting in 1999. It is state-listed as endangered and is a California fully protected species. Bald eagle nests in tall trees, often near water. It is an opportunistic forager, feeding on fish, waterfowl, and carrion. Breeding territory for bald eagle has been expanding in the past several decades, which prompted the proposal for federal delisting.

Western burrowing owl. See description in the San Joaquin Region section for status and ecology.

California clapper rail (*Rallus longirostris obsoletus*) is a federal and state endangered species and a California fully protected species. It is a secretive, hen-like bird that nests and forages in emergent wetlands with pickleweed (*Salicornia* spp.), cordgrass (*Spartina foliosa*), gumplant (*Grindelia stricta* var. *angustifolia*), and bulrush (*Scirpus* spp.). Clapper rails are non-migratory, but juveniles have been known to move as much as a half-mile when dispersing. This species feeds primarily on aquatic invertebrates (Goals Project, 2000).

California black rail (*Laterallus jamaicensis coturniculus*) is state-listed as threatened. It relies on tidally influenced, heavily vegetated, high-elevation marshlands. It is highly secretive and is observed mainly during high tides when forced out by high water. Its habitat requirements resemble those of the salt marsh harvest mouse but are more restrictive (Goals Project, 2000).

Western snowy plover (*Charadrius alexandrinus nivosus*) is a federal threatened species and a California species of special concern. It nests and forages on sandy beaches on marine and estuarine shores. It requires sandy, gravely, or friable soils for nesting.

Program Area Occurrence. Bald eagle has been frequently observed wintering near large lakes and reservoirs such as those in the Alameda Creek watershed, and in recent years may be breeding there as well. Western burrowing owl is well distributed in suitable habitat throughout the WSIP study area, especially in the South Bay. The largest populations of California clapper rail occur in the Dumbarton and Mowry Marshes in the East Bay, and the Palo Alto and Greco Marshes on the

Peninsula, both near the Hetch Hetchy Aqueduct. Nesting California black rail were historically known to occur in the South Bay, but the individuals recently observed there are juveniles and non-breeding adults. The majority of western snowy plover nest in salt evaporation ponds south of the San Mateo Bridge, predominantly on the eastern side of San Francisco Bay (using Guadalupe Slough as the division line) (Goals Project, 2000).

Mammals

San Joaquin kit fox. See description in the San Joaquin Region section for status and ecology.

Salt marsh harvest mouse (*Reithrodontomys raviventris*) is a small, native mouse that is both federal and state endangered and California fully protected. It is endemic to the salt marshes and adjacent diked wetlands of San Francisco Bay and is most abundant in the middle and upper portions of salt marshes in the thick perennial cover of pickleweed (Goals Project, 2000).

Program Area Occurrence. Two adult San Joaquin kit fox were sighted recently on another SFPUC project site in the Sunol Valley.[9] Despite this sighting of apparently a pair of transient animals, this species is not otherwise considered present in the Sunol Region. Salt marsh harvest mouse occurs most frequently in suitable habitat that lies generally south of a line between Redwood City and Hayward (Goals Project, 2000).

Plants

Fountain thistle (*Cirsium fontinale* var. *fontinale*) is both a state and federal endangered species. It grows in moist soils near springs and seeps on serpentine soils. It is restricted to just a few populations in the vicinity of Crystal Springs Reservoir and nearby uplands.

San Mateo woolly sunflower (*Eriophyllum latilobum*) is both a state and federal endangered species. It grows in shady openings in live oak woodlands, both on and off serpentine soils. San Mateo woolly sunflower is a highly restricted endemic whose distribution is limited to several hundred individuals in less than a dozen scattered subpopulations in the Crystal Springs area of San Mateo County. Many of the known populations occur on roadcuts along Crystal Springs Road in the San Mateo Creek canyon.

M**arin western flax** (*Hesperolinon congestum)* is both a state and federal threatened species. It grows on serpentine ridges covered with bunchgrass from Marin County to San Mateo County. There are now 20 known occurrences. Residential development and road and freeway construction have eliminated five of the historically known populations of Marin western flax.

Program Area Occurrence. Fountain thistle grows along the shores of Upper Crystal Springs Reservoir. San Mateo woolly sunflower is known to occur in several colonies along Crystal Springs Road, where it is highly vulnerable both to proposed WSIP project activities and to ordinary road maintenance activities. Marin western flax is known to occur in grasslands in the Crystal Springs and San Mateo Creek canyon area.

[9] A single individual was observed during nighttime surveys associated with the SFPUC Sunol / Niles Dam Removal Project in 2006, performed by Environmental Science Associates.

Regulatory and Conservation Planning Framework

Key Special-Status Species and Other Species of Concern

Federal Endangered Species Act

Under the Federal Endangered Species Act (FESA), the Secretary of the Interior (represented by the USFWS) and the Secretary of Commerce (represented by the NMFS) have joint authority to list a species as threatened or endangered (16 United States Code [USC] 1533[c]). Pursuant to the requirements of FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project area and determine whether the project will have a potentially significant impact on such species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed for listing under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]). Project impacts on these species or their habitats are considered potentially significant in this PEIR. Before granting a permit, the U.S. Army Corps of Engineers will ask either or both the USFWS and NMFS to concur with its decision to issue the permit. If endangered species or endangered migratory fish protected under FESA are present in the project area, a consultation under Section 7 of the act may be required. Consultations may be either formal or informal. If a formal consultation is required, the project proponent prepares a Biological Assessment to evaluate the potential impacts of a particular project on listed species that are known or likely to occur in the project area. The agency with jurisdiction over the listed species (either the USFWS or NMFS) then reviews the Biological Assessment and issues a Biological Opinion (the agency's determination as to whether or not the proposed project will jeopardize the listed species), which includes the conditions under which the project may proceed; an incidental take permit is also issued, identifying the number of individuals of the listed species allowed to be harmed by project activities without violating the terms of the permit. If appropriate for certain listed species (e.g., California red-legged frog), the Corps may invoke a Programmatic Biological Opinion.[10]

FESA of 1973 was amended in 1982 under Section 10 of the act to permit the "taking" (i.e., killing, harassing, or disturbing the habitat of) federally listed species when such taking was incidental to an otherwise lawful activity (16 USC 1539). It was the intent of Congress to resolve the issues of onsite taking of listed species or critical habitat by creating the habitat conservation plan (HCP) process. An HCP accompanies a permit application to "take" a certain number of threatened and endangered species or acres of their habitat over a certain period of time, and demonstrates that the permit applicant will compensate for the taking so as to achieve "no net reduction" in the species' chances for survival. There is one adopted HCP in the WSIP study area—the *San Joaquin County Multi-species Habitat Conservation and Open Space Plan*. Several other HCPs are under preparation, including two by the SFPUC for operations on its Peninsula and Alameda watersheds and one by a multi-agency partnership that includes Santa Clara County, Santa Clara Valley Water District, the City of San Jose, the Santa Clara Valley Transit Authority,

[10] A Programmatic Biological Opinion is a general set of rules designed to protect the listed species; these rules must be followed during construction of certain types of projects that frequently recur within the range of the species (e.g., road or culvert repairs).

and the Cities of Gilroy and Morgan Hill. Section 4.2, Plans and Policies, describes HCP efforts underway by the SFPUC. The "Conservation Planning" section below also discusses HCP efforts in more detail.

The USFWS also publishes a list of candidate species for listing. Species on this list receive special attention from federal agencies during environmental review, although they are not otherwise protected under FESA. The candidate species are those for which the USFWS has sufficient biological information to support a proposal to list as endangered or threatened. Project impacts on such species may, on a case-by-case basis, be considered potentially significant in this PEIR.

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFG has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code Section 2070). The CDFG also maintains a list of candidate species, which are species that the CDFG has formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. The CDFG also maintains lists of "species of special concern," which are animal species whose populations have diminished and may be considered for listing if declines continue. Pursuant to the requirements of CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the project will have a potentially significant impact on such species. In addition, the CDFG encourages informal consultation on any proposed project that could affect a candidate species.

Actions otherwise prohibited under CESA can be legalized under the state's Natural Community Conservation Planning Act (Fish and Game Code Sections 2800–2840), which is somewhat broader in its orientation and objectives than CESA or FESA. These laws are designed to identify and protect individual species that have already significantly declined in number. The primary objective of the program is to conserve natural communities at the ecosystem scale while accommodating compatible land uses. The program provides limited authorization to adversely affect habitat supporting special-status species.

For the potential taking of individual animals (as opposed to habitat) listed under CESA, there is a permit process somewhat similar to Section 10 of FESA, which allows the USFWS to issue take permits for federally listed species.[11] If the species is listed by California alone, and a proposed project would result in impacts, an incidental take permit pursuant to Section 2081 of the Fish and Game Code would be necessary. The CDFG will issue an incidental take permit only if:

- The authorized take is incidental to an otherwise lawful activity
- The impacts of the authorized take are minimized and fully mitigated

[11] If a landowner obtains a federal take permit for a species that is also state listed, CESA does not require an additional state permit, but CESA Section 2080.1(c) does require the CDFG to review the terms and conditions of the permit to ensure they meet CESA's requirements.

- The measures required to minimize and fully mitigate the impacts of the authorized take are roughly proportional in extent to the impact of the taking on the species; maintain the project applicant's objectives to the greatest extent possible; are capable of successful implementation; and adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with, and the effectiveness of, the measures

California Fully Protected Species

California law (Fish and Game Code Sections 3511, 4700, 5050, and 5515) allows the designation of a species as fully protected. This is a greater level of protection than is afforded by CESA, since such a designation means the listed species cannot be taken at any time.

California Native Plant Protection Act

The California Native Plant Protection Act (Fish and Game Code Sections 1900–1913) and the Natural Communities Conservation Planning Act provide guidance on the preservation of plant resources; these two acts underlie the language and intent of Section 15380(d) of the CEQA Guidelines. Vascular plants listed as rare or endangered by the CNPS (2001), but which have no designated status or protection under federal or state endangered species legislation, are defined as follows:

- List 1A: Plants presumed extinct
- List 1B: Plants rare, threatened, or endangered in California and elsewhere
- List 2: Plants rare, threatened, or endangered in California, but more numerous elsewhere
- List 3: Plants about which more information is needed – a review list
- List 4: Plants of limited distribution – a watch list

In general, plants appearing on CNPS List 1A, 1B, or 2 are considered to meet the criteria of Section 15380 of the CEQA Guidelines. Additionally, plants listed on CNPS List 1A, 1B, or 2 also meet the definition of Section 1901, Chapter 10 (Native Plant Protection Act) and Sections 2062 and 2067 (CESA) of the California Fish and Game Code.

Other Statutes, Codes, and Policies Affording Limited Species Protection

The federal Migratory Bird Treaty Act (MBTA) (16 USC, Section 703, Supp. I, 1989) prohibits killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. For projects that would not result in the direct mortality of birds, the MBTA is generally interpreted in CEQA analyses as protecting active nests of all species of birds that are included in the "List of Migratory Birds" published in the Federal Register in 1995.

Independent of the MBTA, birds of prey are protected in California under the Fish and Game Code (Section 3503.5, 1992). Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Disturbance

that causes nest abandonment and/or loss of reproductive effort is considered taking by the CDFG. Any loss of fertile eggs, nesting raptors, or any activities resulting in nest abandonment would constitute a potentially significant impact. This approach would apply to red-tailed hawks, American kestrels, burrowing owls, and other birds of prey. Substantial adverse project impacts on these species are considered potentially significant in this PEIR if a species is known or has a high potential to nest on the site or rely on it for primary foraging.

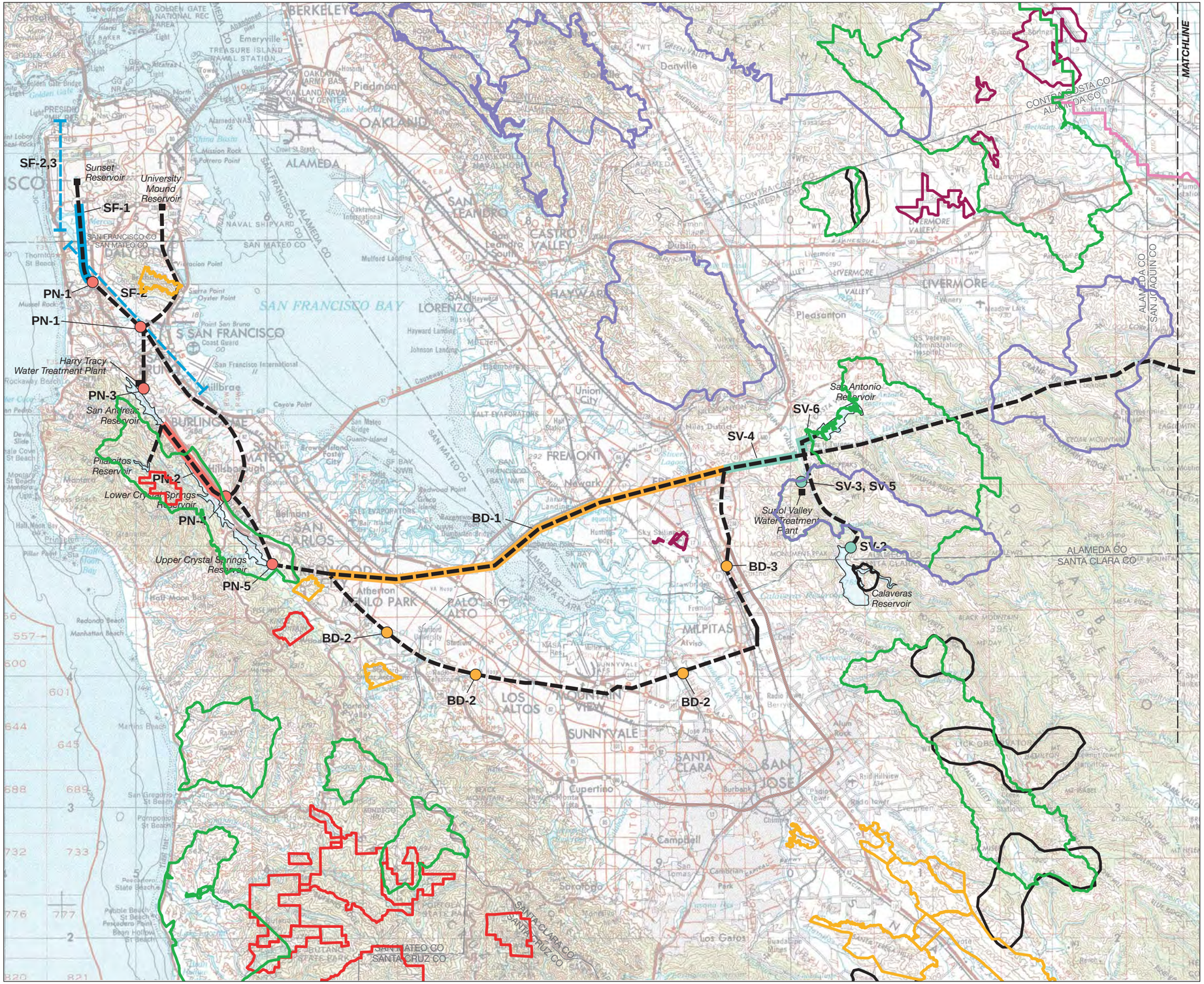
The federal Bald Eagle Protection Act prohibits persons within the United States (or places subject to U.S. jurisdiction) from "possessing, selling, purchasing, offering to sell, transporting, exporting or importing any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof."

Sensitive Natural Communities and Critical Habitat

The CDFG has identified several natural communities within California (as distinct from the organisms they support) as rare and/or sensitive. These natural communities are of special significance because the present rate of loss indicates that acreage reductions or habitat degradation could threaten the viability of dependent plant and wildlife species and possibly hinder the long-term sustainability of the community or species dependent on the community. As natural communities diminish, the need to list dependent plant and wildlife species as rare, threatened, or endangered under the state or federal endangered species acts increases. The loss of some significant natural communities can diminish valued ecosystem functions, such as the roles of marshes in water filtration or of riparian woodlands in riverbank stabilization.

The primary types of sensitive habitat are wetlands, including riparian habitat types such as sycamore alluvial woodland and willow scrub. Almost all types of wetlands are highly biologically active, and almost all have suffered significant declines in California. Various laws and regulations protect wetlands, as described below. Other sensitive habitats that could occur in the program area but are too small to map at the GAP level of analysis include native grasslands, such as serpentine grassland, native bunchgrass grassland, and alkali meadow.

Officially designated critical habitat is also included in this category. Critical habitat is defined as specific areas that are essential to the conservation of a federally listed species, and which may require special management considerations or protection. Critical habitat is determined using the best available scientific information about the physical and biological needs of the species. These needs, or primary constituent elements, include: space for individual and population growth and for normal behavior; food, water, light, air, minerals, or other nutritional or physiological needs; cover or shelter; sites for breeding, reproduction, and rearing of offspring; habitat that is protected from disturbance or is representative of the historical geographic and ecological distribution of a species. Critical habitats are delineated on maps published in the Federal Register and are subject to modification from time to time. **Figure 4.6-2** displays those critical habitats in effect at the time of PEIR preparation.



Vernal pool species:
Longhorn fairy shrimp *(Branchinecta longiantennis)*
Vernal pool fairy shrimp *(Branchinecta lynchi)*
Vernal pool tadpole shrimp *(Lepidurus packardi)*
Alkali goldfields *(Lasthenia conjugens)*
(Note: Not all listed secies occur in all polygons.)

Delta smelt *(Hypomesus transpacificus)*

California tiger salamander *(Ambystoma californiense)*

California red-legged frog *(Rana aurora draytonii)*

Bay checkerspot butterfly *(Euphydryas editha editha [=E. e. bayensis])*

Alameda whipsnake *(Mastcophis lateralis euryxanthus)*

Marbled murrelet *(Brachyramphus marmoratus)*

Notes:
1. A federally-listed species may occur outside its designated critical habitat.
2. Some federally-listed species do not have a designated critical habitat.
3. Critical habitat may be designated for federally-listed species only. Some critical habitats shown on this figure are for species that will not be impacted by the WSIP project.
4. Location of critical habitat in relation to WSIP is for guidance only. Published critical habitats are revised periodically. Current critical habitat boundaries will be analyzed during project-specific CEQA reviews.

Existing System Corridor

Existing System Facility

Proposed Facility Corridor

Proposed Facility Site

Proposed Facility, General Location

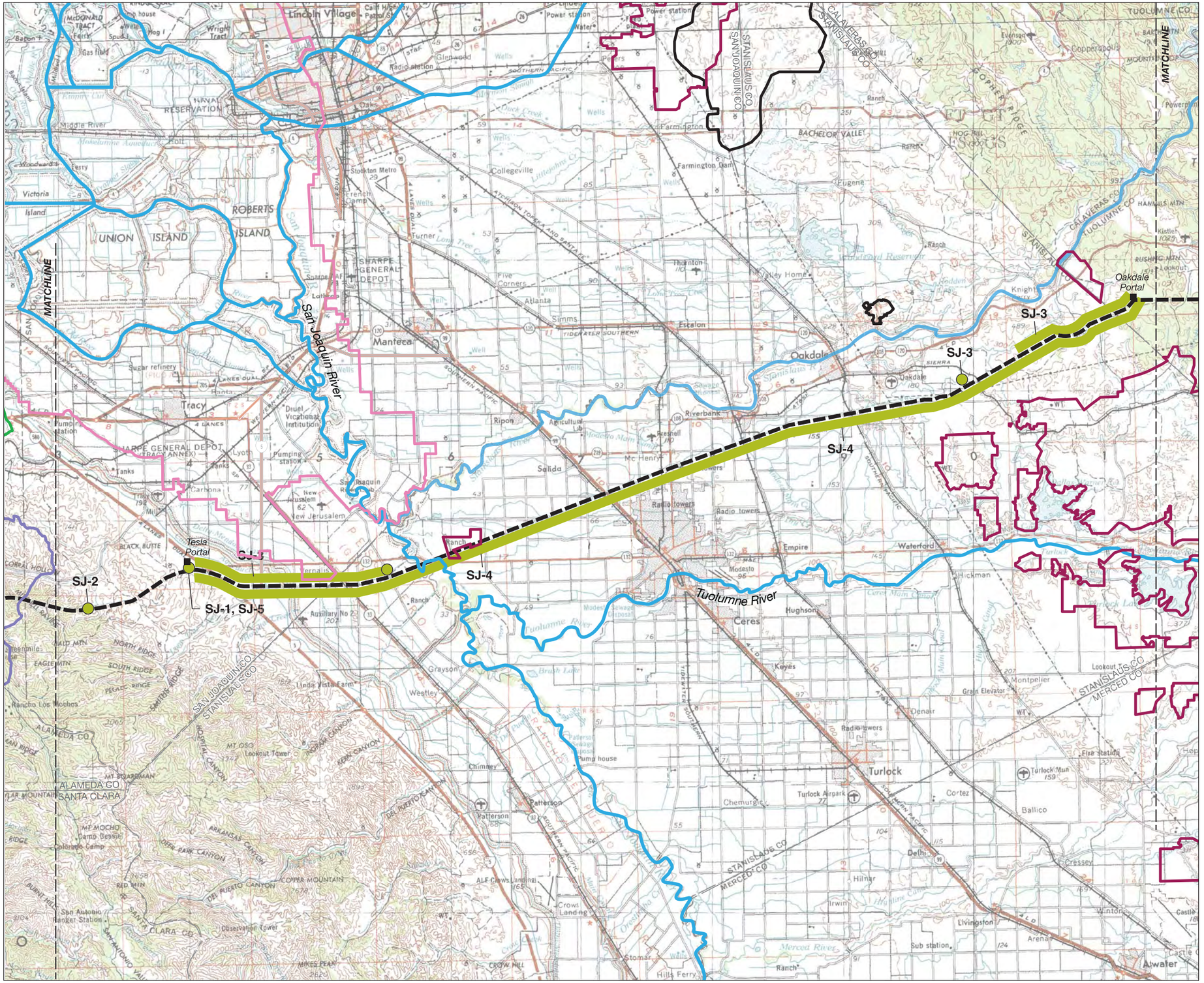
Note: See Figure 4.1-2 for full Project Names

0 5
Miles

SOURCE: U.S. Fish and Wildlife Service, 2005

SFPUC Water System Improvement Program . 203287

Figure 4.6-2a
Critical Habitats in the WSIP Study Area



Vernal pool species:
Vernal pool fairy shrimp *(Branchinecta lynchi)*
Conservancy fairy shrimp *(Branchinecta conservatio)*
Vernal pool tadpole shrimp *(Lepidurus packardi)*
Hoover's spurge *(Chamaesyce hooveri)*
Succulent owl's-clover *(Castilleja campestris ssp. succulenta)*
Colusa grass *(Neostapfia colusana)*
San Joaquin Valley Orcutt grass *(Orcuttia inaequalis)*
Hairy Orcutt grass *(Orcuttia pilosa)*
Greene's tuctoria *(Tuctoria greenei)*
(Note: Not all listed secies occur in all polygons.)

Delta smelt *(Hypomesus transpacificus)*

California tiger salamander *(Ambystoma californiense)*

California red-legged frog *(Rana aurora draytonii)*

Alameda whipsnake *(Mastcophis lateralis euryxanthus)*

Central Valley District Population Segment Steelhead *(Oncorhynchus mykiss)*

Notes:
1. A federally-listed species may occur outside its designated critical habitat.
2. Some federally-listed species do not have a designated critical habitat.
3. Critical habitat may be designated for federally-listed species only. Some critical habitats shown on this figure are for species that will not be impacted by the WSIP project.
4. Location of critical habitat in relation to WSIP is for guidance only. Published critical habitats are revised periodically. Current critical habitat boundaries will be analyzed during project-specific CEQA reviews.

Existing System Corridor

Existing System Facility

Proposed Facility Corridor

Proposed Facility Site

Proposed Facility, General Location

Note: See Figure 4.1-2 for full Project Names

0 5
Miles

SOURCE: U.S. Fish and Wildlife Service, 2005, CDFG, 2007

SFPUC Water System Improvement Program . 203287

Figure 4.6-2b
Critical Habitats in the WSIP Study Area

Vernal pool species:
Vernal pool fairy shrimp *(Branchinecta lynchi)*
Conservancy fairy shrimp *(Branchinecta conservatio)*
Vernal pool tadpole shrimp *(Lepidurus packardi)*
Hoover's spurge *(Chamaesyce hooveri)*
Succulent owl's-clover *(Castilleja campestris ssp. succulenta)*
Colusa grass *(Neostapfia colusana)*
San Joaquin Valley Orcutt grass *(Orcuttia inaequalis)*
Hairy Orcutt grass *(Orcuttia pilosa)*
Greene's tuctoria *(Tuctoria greenei)*
(Note: Not all listed secies occur in all polygons.)

California tiger salamander *(Ambystoma californiense)*

Notes:
1. A federally-listed species may occur outside its designated critical habitat.
2. Some federally-listed species do not have a designated critical habitat.
3. Critical habitat may be designated for federally-listed species only. Some critical habitats shown on this figure are for species that will not be impacted by the WSIP project.
4. Location of critical habitat in relation to WSIP is for guidance only. Published critical habitats are revised periodically. Current critical habitat boundaries will be analyzed during project-specific CEQA reviews.

Existing System Corridor
Existing System Facility
Proposed Facility Corridor
Proposed Facility Site
Proposed Facility, General Location

Note: See Figure 4.1-2 for full Project Names

0 5
Miles

SOURCE: U.S. Fish and Wildlife Service, 2005

Figure 4.6-2c
Critical Habitats in the WSIP Study Area

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Federal and State Provisions Applying to Wetlands

In a jurisdictional sense, there are two definitions of a wetland, one adopted by federal agencies and another adopted by the State of California. Both definitions are presented below.

Federal Wetland Definition. Wetlands are a subset of "waters of the United States" and receive protection under Section 404 of the Clean Water Act. The term "waters of the United States,"[12] as defined in Code of Federal Regulations (33 CFR 328.3[a]; 40 CFR 230.3[s]), includes:

1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.

2. All interstate waters including interstate wetlands. (Wetlands are defined by the federal government [CFR, Section 328.3(b)] as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.)

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce including any such waters which are or could be used by interstate or foreign travelers for recreational or other purposes; or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce.

4. All impoundments of waters otherwise defined as waters of the United States under the definition.

5. Tributaries of waters identified in paragraphs (1) through (4).

6. Territorial seas.

7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6).

8. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the U.S. Environmental Protection Agency.

[12] Based on the Supreme Court ruling in *Solid Waste Agency for Northern Cook County v. U.S. Army Corps of Engineers* (SWANCC) concerning the Clean Water Act jurisdiction over isolated waters (January 9, 2001), non-navigable, isolated, intrastate waters are no longer defined as waters of the United States based solely on their use by migratory birds. Jurisdiction of non-navigable, isolated, intrastate waters may be possible if their use, degradation, or destruction could affect other waters of the Unites States, or interstate or foreign commerce. Jurisdiction over such other waters should be analyzed on a case-by-case basis. Impoundments of waters, tributaries of waters, and wetlands adjacent to waters should be analyzed on a case-by-case basis. Further legal cases recently decided by the Court (e.g., *Rapanos* and *Carabel*) have not yet been interpreted in Corps regulations or definitions.

California Wetland Definition. California has adopted the Cowardin et al. (1979) classification system to define wetlands. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes[13] (at least 50 percent of the aerial vegetative cover); (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (Cowardin et al., 1979).

Under normal circumstances, the federal definition of wetlands requires all three wetland identification parameters to be met, whereas the Cowardin definition requires the presence of at least one of these parameters.

Regulation of Activities in Wetlands. The regulations and policies of various federal agencies (e.g., U.S. Army Corps of Engineers, U.S. EPA, USFWS, NMFS) mandate that the filling of wetlands be avoided unless it can be demonstrated that no practicable alternatives exist. The Corps has primary federal responsibility for administering regulations that concern waters and wetlands. In this regard, the Corps acts under two statutory authorities: the Rivers and Harbors Act (Sections 9 and 10), which governs specified activities in "navigable waters," and the Clean Water Act (Section 404), which governs specified activities in waters of the United States, including wetlands. The Corps requires that a permit be obtained if a project proposes to place structures within navigable waters and/or to alter waters of the United States below the ordinary high-water mark in nontidal waters. The U.S. EPA, USFWS, NMFS, and several other agencies may provide comment on Corps permit applications. The U.S. EPA has provided the primary criteria for evaluating the biological impacts of Corps permit actions in wetlands.

The state's authority to regulate activities in wetlands and water at the project sites resides primarily with the California Regional Water Quality Control Board (RWQCB), which regulates construction in waters of the United States and waters of the state, including activities in wetlands, under both the Clean Water Act and the State of California's Porter-Cologne Water Quality Control Act. The CDFG provides comment on Corps permit actions under the Fish and Wildlife Coordination Act. The CDFG is also authorized under the Fish and Game Code, Sections 1600–1607, to develop mitigation measures and enter into a streambed alteration agreement with applicants proposing a project that would obstruct the flow or alter the bed, channel, or bank of a river or stream in which there is a fish or wildlife resource, including intermittent streams and ephemeral streams (i.e., those flowing briefly during and immediately following storm events). The RWQCB must certify that a Corps permit action meets state water quality objectives (Section 401, Clean Water Act).

State Provisions and Policies Applying to Sensitive Habitats in both Wetlands and Uplands

In addition to the lists of special-status plants and animals, the CDFG maintains a classification of the state's natural communities (both terrestrial and aquatic). The natural community classification is used by a wide variety of government agencies, private conservation organizations, and private biological consultants to help identify and prioritize species preservation, acquisition, or designation activities.

[13] The USFWS has developed the following definition for hydrophytic vegetation: "plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (Cowardin et al., 1979).

Each community is ranked according to its rarity and threat of extinction on both global and statewide scales, regardless of its state or federal listing or management status.[14] By virtue of the rarity or sensitivity of such natural communities (as determined by the state authority responsible for resource protection), impacts on such a community may be considered significant under CEQA.

Local Laws, Regulations, and Policies Applying to Natural Resource Protection

The San Francisco Bay Conservation and Development Commission (BCDC) was formed in 1969 under the McAteer-Petris Act to regulate development in and around San Francisco Bay. BCDC developed the San Francisco Bay Plan to guide the wise use of the bay's water and shorelines. In reviewing permit applications for projects within its jurisdiction, BCDC relies on its Bay Plan policies to ensure the protection of habitats and biological resources, including fish, other aquatic organisms, and wildlife, and water quality; as well as policies on uses of the bay and shoreline.

City and county general plans usually contain provisions to maintain parks and open space, and to protect valued biological resources such as wetlands. Many of the resources protected by local policies and ordinances also are protected under state and federal laws and regulations; others, such as heritage trees, are not. **Table 4.6-1** lists vegetation ordinances (including tree protection ordinances) adopted by jurisdictions where WSIP projects are proposed. Consistency with the provisions of these ordinances (as well as the habitat conservation planning efforts described below) would be further evaluated during preparation of project-specific CEQA documentation.

Conservation Planning in the WSIP Study Area

SFPUC Watershed Management Plans

The SFPUC articulates its policies for the protection and management of key special-status species and other species of concern in its Alameda and Peninsula Watershed Management Plans (WMPs) (SFPUC, 2001, 2002). (See Section 4.2, Plans and Policies, for a more detailed description of this topic.) SFPUC policy is to preserve, protect, and enhance significant botanical and wildlife resources, including rare, threatened, endangered, and sensitive species and their habitat, and to preserve biodiversity and genetic diversity of wildlife populations where possible. The policy requires a site-specific analysis prior to implementing facility and infrastructure projects, operations and maintenance activities, and construction projects in order to determine the presence of sensitive vegetation and wildlife and the potential effects of the activity on these resources. Analyses must be conducted in accordance with applicable state and federal laws, statutes, and guidelines.

[14] Global and State Sensitivity Rankings are part of a system devised by the CDFG to provide information on the rarity of a species or community. For example, G1 is defined as: less than six viable element occurrences *or* less than 1,000 individuals *or* less than 2,000 acres.

Habitat Conservation Plans (HCPs)

Habitat conservation plans provide comprehensive, long-term conservation measures for species listed as threatened or endangered under the California and Federal Endangered Species Acts, or for species that could be listed in the future. Several conservation plans are described below, two of which have been adopted: the *San Joaquin County Multi-species Habitat Conservation and Open Space Plan* and the *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan*.

TABLE 4.6-1
PERTINENT LOCAL VEGETATION ORDINANCES

Jurisdiction and Code	Ordinances
San Joaquin County Ordinance Code (amended through July 27, 2004)	Title 10, Streets and Highways, Division 5, Miscellaneous Regulations, Chapter 2, Trees, Shrubs and Other Plants
Alameda County General Code (amended through March 2005)	Title 12, Public Roadways and Parks, Chapter 12.11, Regulation of Trees in County Right-of-Way
Santa Clara County Ordinance Code (amended through September 28, 2004)	Title C, Construction, Development and Land Use, Division C16, Tree Preservation and Removal
San Mateo County Ordinance Code (amended through June 7, 2005)	Title 3, Public Safety, Morals and Welfare, Chapter 3.92, Street Trees
Fremont Municipal Code (amended through May 24, 2005)	Title IV, Sanitation and Health, Chapter 5, Tree Preservation
	Title VI, Public Works and Public Utilities, Chapter 2, Street Trees
Newark Municipal Code (amended through February 2005)	Title 12, Streets, Sidewalks and Public Places, Chapter 12.28, Parkway Maintenance
	Title 8, Health and Safety, Chapter 8.16, Preservation of Trees on Private Property
Hayward Municipal Code	Chapter 10, Planning, Zoning and Subdivisions, Article 15, Tree Preservation
Milpitas Municipal Code (amended through July 2005)	Title X, Trees and Sidewalks, Chapter 2, Tree and Planting
San Jose Municipal Code	Chapter 13.28, Trees, Hedges and Shrubs
Santa Clara City Code (amended through June 28, 2005)	Title 12, Streets, Sidewalks and Public Places, Chapter 12.35, Trees and Shrubs
Mountain View Municipal Code	Chapter 32, Protection of the Urban Forest
Los Altos Municipal Code	Title 11, Chapter 11.08, Tree Protection Regulations
Palo Alto Municipal Code (amended through May 25, 2005)	Title 8, Trees and Vegetation, Chapter 8.04, Street Trees, Shrubs and Plants
	Title 8, Trees and Vegetation, Chapter 8.10, Tree Preservation and Management Regulations
East Palo Alto Municipal Code (amended through June 15, 2004)	Title 13, Public Services, Chapter 13.24, Water System, Section 13.24.410, Street Trees
Menlo Park Municipal Code (amended through March 2005)	Title 13, Streets, Sidewalks and Utilities, Chapter 13.24, Heritage Trees
	Title 13, Streets, Sidewalks and Utilities, Chapter 13.20, Street Trees, Shrubs and Plants
Atherton Municipal Code (amended through May 18, 2005)	Title 8, Health and Safety, Chapter 8.10, Removal of and Damage to Heritage Trees
Redwood City Municipal Code (amended through March 2005)	Chapter 18, Local Improvements and Planning, Article XIV, Local Development Standards, Section 18.241, Street Improvements – Street Trees
	Chapter 29, Streets, Sidewalks and Driveways, Article VI, Planting and Care of Trees and Other Vegetation on Public Streets
	Chapter 35, Tree Preservation
San Mateo Municipal Code	Title X, Peace, Safety and Morals, Chapter 10.52, Heritage Trees
Hillsborough Municipal Code (amended through February 14, 2005)	Title 14, Trees, Chapter 14.04, Tree Removal

TABLE 4.6-1 (Continued)
PERTINENT LOCAL VEGETATION ORDINANCES

Jurisdiction	Ordinances
Burlingame Municipal Code (amended through January 2004)	Title 11, Trees and Vegetation, Chapter 11.04, Street Trees
	Title 11, Trees and Vegetation, Chapter 11.06, Urban Reforestation and Tree Protection
	Title 11, Trees and Vegetation, Chapter 11.12, Obstructing View at Intersections
Millbrae Municipal Code (amended through June 14, 2005)	Title 8, Public Works, Chapter 8.60, City of Millbrae Tree Protection and Urban Forestry Program
San Bruno Municipal Code	Title 8, Streets, Sidewalks, and Rights-of-Way, Chapter 8.24, Street Trees and Other Plantings
	Title 8, Streets, Sidewalks, and Rights-of-Way, Chapter 8.25, Heritage Trees
South San Francisco Municipal Code (amended through June 2005)	Title 13, Public Improvements, Chapter 13.28, Street Trees
	Title 13, Public Improvements, Chapter 13.30, Tree Preservation
Brisbane Municipal Code (amended through April 2005)	Title 12, Streets, Sidewalks and Public Places, Chapter 12.12, Tree Regulations
Daly City Municipal Code (amended through April 2005)	Title 12, Streets, Sidewalks and Public Places, Chapter 12.40, Urban Forestry
San Francisco Public Works Code (amended through August 19, 2005)	Article 16, Urban Forestry Ordinance

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan. The *San Joaquin County Multi-species Habitat Conservation Plan and Open Space Plan* provides a strategy for conserving open space while addressing the need to convert open space to non-open-space uses, protecting agricultural resources, preserving property rights, and providing for the long-term management of plant, fish, and wildlife species, especially special-status species. A Joint Powers Authority/Technical Advisory Committee implements the *Multi-species Habitat Conservation Plan and Open Space Plan* (SJMSCP JPA, 2001). The WSIP projects located in San Joaquin County are the Advanced Disinfection (SJ-1), Lawrence Livermore (SJ-2), SJPL System (SJ-3), SJPL Rehabilitation (SJ-4), and Tesla Portal Disinfection (SJ-5) projects.

Draft Santa Clara Valley Habitat Conservation Plan / Natural Communities Conservation Plan. The City of San Jose, Santa Clara County, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, City of Gilroy, and City of Morgan Hill have initiated a collaborative process to prepare and implement a habitat conservation plan/natural communities conservation plan (HCP/NCCP) for the Santa Clara Valley. The Draft Santa Clara Valley HCP/NCCP targets specifics areas of the county where land development activities and the continued survival of endangered, threatened, or other species of concern are in conflict. The goal of this plan is to provide the means for conservation of these species, thereby contributing to their recovery while allowing for compatible and appropriate development to occur. The HCP/NCCP and associated environmental documentation are scheduled for completion in 2009 (Santa Clara Valley HCP/NCCP, 2007).

SFPUC Habitat Conservation Plans. The SFPUC is also developing HCPs for its watershed lands as part of implementation of the Alameda and Peninsula WMPs. The Peninsula and Alameda Creek watershed HCPs are being prepared in compliance with federal and state regulations for endangered species protection. The HCPs will identify specific species to be covered, including steelhead, in consultation with federal and state resource agencies. The plans will also identify and describe SFPUC watershed operations and maintenance activities to be covered. The intent of the HCPs is to minimize and/or mitigate potential adverse effects on species addressed in the plans that could result from watershed operations and maintenance activities through implementation of conservation programs. The conservation programs will focus on providing long-term protection of covered species by protecting biological communities in the watersheds. The draft Alameda Creek watershed HCP is scheduled for public review in 2007, and the draft Peninsula watershed HCP is scheduled for public review in 2008. The plans are subject to environmental review by the San Francisco Planning Department before the SFPUC can consider adoption and begin implementation.

San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan. The San Joaquin River National Wildlife Refuge (NWR) was established in 1987 as a unit of the San Luis NWR complex with its primary goal initially to protect habitat for the Aleutian Canada goose, then a federally listed endangered species. Its goals have since been expanded to include protection for other threatened and endangered species, and restoration of wetlands and floodplain habitat and the species that depend on them. The approved Refuge boundary encompasses 12,887 acres along the San Joaquin River both north and south of the confluence with the Tuolumne River (USFWS, 2007). About three miles of the Hetch Hetchy Aqueduct crosses the San Joaquin River NWR. The SJPL System (SJ-3) project could extend into the western portion of the NWR, primarily in cropland and recently established floodplain riparian habitat near the San Joaquin River. The SJPL Rehabilitation project (SJ-4) could involve repair and replacement of pipeline within the San Joaquin River NWR (generally within the pipelines right-of-way), including areas adjacent to floodplain, native grassland, cropland and irrigated pasture.

The USFWS has adopted a comprehensive conservation plan (CCP) that describes the goals, objectives, and management strategies of the CCP. The five primary goals of the San Joaquin River NWR CCP, as identified in the CCP/EA (USFWS, 2007), are summarized below:

- *Biological Diversity.* Conserve and protect the natural diversity of migratory birds, resident wildlife, fish, and plants through restoration and management of riparian, upland, and wetland habitats on refuge lands.
- *Threatened and Endangered Species.* Contribute to the recovery of threatened/endangered species, as well as the protection of populations of special-status wildlife and plant species and their habitats.
- *Aleutian Canada Goose.* Provide optimum wintering habitat for Aleutian Canada geese to ensure the continued recovery from threatened and endangered status.
- *Ecosystem Management.* Coordinate the natural resource management of the San Joaquin River NWR within the context of the larger Central Valley/San Francisco Ecoregion.

- *Public Use of the Refuge.* Provide the public with opportunities for compatible, wildlife-dependent visitor serves to enhance understanding, appreciation, and enjoyment of natural resources at the San Joaquin River NWR (USFWS, 2007).

4.6.2 Impacts

Significance Criteria

The CCSF has not formally adopted significance standards for impacts related to biological resources, but generally considers that implementation of the proposed program would have a significant biological impact if it were to:

- 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 the CDFG or USFWS (Evaluated in this section)

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS (Evaluated in this section)

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act and as protected under the Porter-Cologne Water Quality Control Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (Evaluated in this section)

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites (Evaluated in this section)

- Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or substantially reduce the number or restrict the range of an endangered, rare or threatened species (Evaluated in this section)

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (Evaluated in this section)

- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan (Evaluated in this section)

Approach to Analysis

The potential for key special-status species occurrence in the WSIP study area was determined based on CNDDB records (CDFG, 2007b), CDFG and USFWS lists of species (CDFG, 2007a; Federal Register, 2006b), CNPS data (CNPS, 2005), and GAP analysis maps, species ranges, and habitat suitability information from such sources as Mayer and Laudenslayer (1988). Other documents prepared for the SFPUC supplied additional information (e.g., ESA, 1999); however,

no site-specific surveys were conducted for this programmatic analysis. This process resulted in the selection of the key special-status species described above in the Setting. These species are evaluated in terms of their reasonably predictable responses to proposed facility construction and operation (based on such factors as the size of the project footprint and proximity to known occupied habitat). While some sensitive natural communities could be identified at this program level of analysis, others are evaluated based on a reasonable probability of occurrence and impact. More detailed analyses would be performed during separate, project level CEQA review of the WSIP projects.

"Rare" and "endangered" are analogous terms defined in CEQA Guidelines Sections 15380(a) and 15380(d) and provide additional regulatory guidance. Program impacts on species listed as endangered or threatened under CESA or FESA are considered potentially significant in this PEIR. Impacts on other species of special concern are considered significant under certain circumstances. However, a detailed analysis of potential impacts on these species at the program level is not feasible because of the large number of other species of special concern, each with its own ecological characteristics, and because many aspects of the projects have not yet been defined. Impacts on many of these species would be similar to those on the sensitive natural communities, upon which most of these species depend.

For the purposes of this PEIR, the definition of the word "substantial" (as used in the significance criteria) has three principal components:

- Magnitude and duration of the impact (e.g., substantial/not substantial)
- Uniqueness of the affected resource (rarity)
- Susceptibility of the affected resource to disturbance

The evaluation of significance must also consider the interrelationship of these three components. For example, a relatively small-magnitude impact on a state or federally listed species would be considered significant because the species is rare and is believed to be very susceptible to disturbance. Conversely, a natural community such as California annual grassland is not necessarily rare or sensitive to disturbance, and thus a much larger magnitude of impact would be required to result in a significant impact. Impacts on biological resources are considered significant when project-related habitat modifications (e.g., development, introduction of non-native plant and animal species, increased human intrusion, barriers to movement, or landscape management) could reduce species populations to the extent that they become locally less numerous; impacts on habitats are considered significant when the habitats could not continue to support viable populations of associated plant and animal species as a result of project implementation.

Before identifying ways to lessen or mitigate these impacts, the PEIR preparers reviewed the Alameda and Peninsula WMPs (SFPUC, 2001, 2002) for guidance on actions that would routinely be applied to projects on SFPUC lands and for consistency between the WMPs and mitigation identified in this PEIR. For example, Policy V15 (for the Alameda watershed) requires a site-specific analysis prior to implementing facility and infrastructure projects, operations and maintenance activities, and construction projects to determine the presence of sensitive vegetation

resources and the potential effects of the activity on the resource. Policy W6 (for the Peninsula watershed) stipulates that the integrity of the watershed creeks must be maintained to preserve their value as riparian ecosystems and wildlife corridors. Policy V15 ensures that the WSIP projects would be subject to a site-specific analysis independent of CEQA mitigation requirements and would be consistent with SFPUC Construction Measure #8 for biological resources, and Policy W6 sets a significance standard, based on local policy, which makes loss of riparian integrity a significant impact.

This PEIR evaluates the potential for impacts of the facility improvement projects at a program level and does not address project-specific aspects that require design details, such as the size and location of borrow and spoils areas; site-specific locality information, such as the location of key special-status species; and information typically developed at the project level, such as local hydrology. Project-specific information would be needed to determine the nature and extent of impacts more precisely and would be developed during the separate CEQA review of individual WSIP projects.

This analysis also proposes general, programmatic mitigation measures that could reduce identified program-level impacts to a less-than-significant level where adequate information is known; in some cases, additional analysis at the project level would be needed to identify project-specific mitigation measures to reduce impacts to a less-than-significant level. Mitigating the impacts of infrastructure projects is not a new regulatory or applied ecological endeavor in California. The natural history of most of the species involved is well enough understood, and there have been sufficient opportunities to test mitigation measures based on this understanding. Therefore, reliance on precedent and standard practice is justifiable for most projects. For example, burrowing owl impact analysis and mitigation was the subject of a CDFG staff report in 1995 (California Burrowing Owl Consortium, 1995); the USFWS developed guidance for California red-legged frog 1997, and programmatic avoidance measures/mitigations for San Joaquin kit fox and red-legged frog in 1997 and 1999, respectively (USFWS, 1997, 1999). For this reason, this PEIR is able to recommend standard programmatic mitigation measures for constructing project facilities based on accepted protocols.

[Additional discussion on the appropriate level of detail for analysis of biological resources was prepared in response to comments on the Draft PEIR. Please refer to Section 14.4, Master Response on PEIR Appropriate Level of Analysis (Vol. 7, Chapter 14).]

Impact Summary by Region

Table 4.6-2 presents a summary of impacts of the WSIP projects by region. While implementation of various WSIP projects would result in potentially significant impacts on biological resources, all impacts identified herein are determined to be less than significant with mitigation. **Table 4.6-3** summarizes the natural habitats and key special-status species with the potential to occur at each WSIP facility site. Table 6-1 in Chapter 6 summarizes the mitigation measures that might be required at each WSIP facility site if these habitats and species are found, and Table 6-2 defines the mitigation measures in detail.[15]

[15] The measures in Table 6-2 are not applicable at every site and could be modified for individual projects.

TABLE 4.6-2
POTENTIAL IMPACTS AND SIGNIFICANCE – BIOLOGICAL RESOURCES

Projects	Project Number	Impact 4.6-1: Impacts on wetlands and aquatic resources	Impact 4.6-2: Impacts on sensitive habitats, common habitats, and heritage trees	Impact 4.6-3: Impacts on key special-status species – direct mortality and/or habitat effects	Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources	Impact 4.6-5: Conflicts with adopted conservation plans or other approved biological resources plans
San Joaquin Region						
Advanced Disinfection	SJ-1	PSM	PSM	PSM	LS	N/A
Lawrence Livermore Supply Improvements	SJ-2	PSM	PSM	PSM	LS	N/A
San Joaquin Pipeline System	SJ-3	PSM	PSM	PSM	PSM	PSM
Rehabilitation of Existing San Joaquin Pipelines	SJ-4	PSM	PSM	PSM	PSM	PSM
Tesla Portal Disinfection Station	SJ-5	PSM	PSM	PSM	LS	N/A
Sunol Valley Region						
Alameda Creek Fishery Enhancement	SV-1	PSM	PSM	PSM	LS	LS
Calaveras Dam Replacement	SV-2	PSM	PSM	PSM	LS	LS
Additional 40-mgd Treated Water Supply	SV-3	PSM	PSM	PSM	LS	LS
New Irvington Tunnel	SV-4	PSM	PSM	PSM	PSM	LS
SVWTP – Treated Water Reservoirs	SV-5	PSM	PSM	PSM	LS	LS
San Antonio Backup Pipeline	SV-6	PSM	PSM	PSM	LS	LS
Bay Division Region						
Bay Division Pipeline Reliability Upgrade	BD-1	PSM	PSM	PSM	PSM	N/A
BDPL Nos. 3 and 4 Crossovers	BD-2	PSM	PSM	PSM	PSM	N/A
Seismic Upgrade of BDPL Nos. 3 and 4 at Hayward Fault	BD-3	PSM	PSM	PSM	LS	N/A
Peninsula Region						
Baden and San Pedro Valve Lots Improvements	PN-1	LS	PSM	PSM	LS	LS
Crystal Springs/San Andreas Transmission Upgrade	PN-2	PSM	PSM	PSM	LS	LS
HTWTP Long-Term Improvements	PN-3	LS	LS	LS	LS	N/A
Lower Crystal Springs Dam Improvements	PN-4	PSM	PSM	PSM	LS	LS
Pulgas Balancing Reservoir Rehabilitation	PN-5	PSM	PSM	PSM	LS	LS
San Francisco Region						
San Andreas Pipeline No. 3 Installation	SF-1	PSM	PSM	LS	N/A	N/A
Groundwater Projects	SF-2	PSM	PSM	LS	N/A	N/A
Recycled Water Projects	SF-3	PSM	PSM	LS	N/A	N/A

LS = Less than Significant impact, no mitigation required
PSM= Potentially Significant impact, can be mitigated to less than significant
N/A = Not Applicable

TABLE 4.6-3
ESTIMATED PROJECT ACREAGE AND POTENTIAL OCCURRENCE, BY PROJECT, OF TERRESTRIAL HABITATS AND KEY SPECIAL-STATUS SPECIES

No.	Project Name, Estimated Construction (C) Project Acreage (ac), and estimated borrow (B) and spoils (S) volume, in cubic yards (cy) (TBD=acreage to be determined during project design)	Habitat Types								Suites of Key Special-Status Species						Individual Key Special-Status Species								
		Annual Grassland	Blue Oak Woodland	Valley Foothill Riparian	Coastal Scrub	Coastal Oak and Valley Oak Woodland	Vernal Pools	Saline Emergent Wetland	Freshwater Emergent Wetland	Vernal Pool Invertebrates	Vernal Pool Plants	Riparian and Reservoir Species	Native Grassland Species	Salt Marsh Species	Fishes	Large-Flowered Fiddleneck	Foothill Yellow-Legged Frog	California Red-Legged Frog	California Tiger Salamander	San Francisco Garter Snake	Alameda Whipsnake	Swainson's Hawk	Western Burrowing Owl	San Joaquin Kit Fox
San Joaquin Region																								
SJ-1	Advanced Disinfection (C: 2 ac / B: TBD / S: TBD)	X							X	X								X	X			X	X	X
SJ-2	Lawrence Livermore Supply Improvements (C: TBD / B: TBD / S: TBD)	X	X						X	X						X		X	X			X	X	X
SJ-3	San Joaquin Pipeline System (C: 140–560 ac / B: 0 / S: 424,000 cy)	X	X	X			X		X	X	X	X			X			X	X			X	X	X
SJ-4	Rehabilitation of Existing San Joaquin Pipelines (C: TBD / B: TBD / S: 100,000)	X	X	X		X	X		X	X	X	X			X			X	X			X	X	X
SJ-5	Tesla Portal Disinfection Station (C: 2 ac / B: 0 / S: 0)	X								X								X	X				X	X
Sunol Valley Region																								
SV-1	Alameda Creek Fishery Enhancement (C: TBD / B: TBD / S: TBD	X		X	X	X			X						X		X	X	X		X		X	
SV-2	Calaveras Dam Replacement (C: 666 ac / B: 6,300,000 cy / S: 4,000,000 cy)	X		X	X	X			X			X	X		X		X	X	X		X		X	
SV-3	Additional 40-mgd Treated Water Supply (C: 1.5 ac / B: 0 / S: 100,000 cy)	X		X	X	X			X				X				X	X	X		X		X	
SV-4	New Irvington Tunnel (C: 120 ac / B: 0 / S: 186,175 cy)	X		X	X	X			X				X					X	X		X		X	
SV-5	SVWTP – Treated Water Reservoirs (C: 10.5 ac / B: 0 / S: 300,000 cy)	X		X	X	X			X				X		X		X	X	X		X		X	
SV-6	San Antonio Backup Pipeline (C: TBD / B: 51,000 cy / S: 37,000 cy)	X		X		X			X				X		X		X	X	X		X		X	
Bay Division Region																								
BD-1	Bay Division Pipeline Reliability Upgrade (C: 165–175 ac / B: 0 / S: 434,000 cy)	X		X		X		X	X	X				X	X			X	X	X			X	
BD-2	BDPL Nos. 3 and 4 Crossovers (C: 1.2 ac / B: 0 / S: 43,500)	X		X		X			X	X					X			X	X				X	
BD-3	Seismic Upgrade of BDPL Nos. 3 and 4 at Hayward Fault (C: TBD / B: 0 / S: 55,300)	X		X					X									X	X				X	

TABLE 4.6-3 (Continued)
ESTIMATED PROJECT ACREAGE AND POTENTIAL OCCURRENCE, BY PROJECT, OF TERRESTRIAL HABITATS AND KEY SPECIAL-STATUS SPECIES

No.	Project Name, Estimated Construction (C) Project Acreage (ac), and estimated borrow (B) and spoils (S) volume, in cubic yards (cy) (TBD=acreage to be determined during project design)	Habitat Types								Suites of Key Special-Status Species						Individual Key Special-Status Species									
		Annual Grassland	Blue Oak Woodland	Valley Foothill Riparian	Coastal Scrub	Coastal Oak and Valley Oak Woodland	Vernal Pools	Saline Emergent Wetland	Freshwater Emergent Wetland	Vernal Pool Invertebrates	Vernal Pool Plants	Riparian and Reservoir Species	Native Grassland Species	Salt Marsh Species	Fishes	Large-Flowered Fiddleneck	Foothill Yellow-Legged Frog	California Red-Legged Frog	California Tiger Salamander	San Francisco Garter Snake	Alameda Whipsnake	Swainson's Hawk	Western Burrowing Owl	San Joaquin Kit Fox
Peninsula Region																								
PN-1	Baden and San Pedro Valve Lots Improvements (C: 2 ac / B: 0 / S: 4,970)								X									X	X	X				
PN-2	Crystal Springs/San Andreas Transmission Upgrade (C: TBD / B: 0 / S: 9,000 cy)	X		X	X	X			X									X	X	X				
PN-3	HTWTP Long-Term Improvements (C: TBD / B: TBD / S: TBD)																	X						
PN-4	Lower Crystal Springs Dam Improvements (C: 6 ac / B: 0 / S: 21,000 cy)	X*		X	X	X			X				X		X			X	X	X				
PN-5	Pulgas Balancing Reservoir Rehabilitation (C: TBD / B: TBD / S: TBD)	X		X	X	X			X						X			X	X	X				
San Francisco Region																								
SF-1	San Andreas Pipeline No. 3 Installation (C: 23 ac / B: 0 / S: 44,170 cy)																							
SF-2	Groundwater Projects (C: 0.7 / B: TBD / S: TBD)	X							X															
SF-3	Recycled Water Projects (C: 5-7 ac / B: 0 / S: 47,200 cy)	X							X															

Notes: Project-specific CEQA documents would review recent special-status species lists relevant to the habitats present. The information presented here is for guidance only, and project design and site-specific assessment is needed to definitively determine the presence of habitats and key special-status species for each project.

Vernal pool invertebrates:
- Vernal pool fairy shrimp
- Conservancy fairy shrimp
- Vernal pool tadpole shrimp

Salt marsh species:
- Western snowy plover
- California clapper rail
- California black rail
- Salt marsh harvest mouse

Fishes:
- Green sturgeon (San Joaquin Valley only)
- Chinook salmon
- Central Valley DPS steelhead
- Central California Coast DPS steelhead
- Rainbow trout (Alameda Creek)

Vernal pool plants:
- Succulent owl's-clover
- Hoover's spurge
- Colusa grass
- San Joaquin Valley Orcutt grass
- Hairy Orcutt grass
- Greene's tuctoria

Riparian and Reservoir species:
- Least Bell's vireo (San Joaquin)
- Valley elderberry longhorn beetle (San Joaquin)
- Riparian woodrat (San Joaquin)
- Delta button-celery (San Joaquin)
- Bald eagle (Sunol Valley)
- Foothill yellow-legged frog

Native grassland species:
- Bay checkerspot butterfly (Peninsula)
- Callippe silverspot butterfly
- Fountain thistle (Peninsula)
- Marin dwarf flax (Peninsula)
- San Mateo woolly sunflower (Peninsula)

Impact 4.6-1: Impacts on wetlands and aquatic resources.

Many of the WSIP projects would affect streams or wetlands that fall under state or federal jurisdiction. Most impacts would be associated with construction activities and thus would be temporary. Projects crossing streams and rivers could require dredging or filling, potentially causing erosion, siltation, and the loss of riparian habitat. In addition, aquatic plants and animals could be stranded by dewatering, exposed to predation, and trampled or crushed. Aquatic resources could also be affected by siltation or degradation of water quality from spills during construction. Hazardous materials, including hydrocarbons such as fuel and lubricants, could enter waterways during construction and contaminate the soil and water, causing direct and indirect impacts on wetlands and aquatic resources (see Sections 4.5, Water Quality, and 4.14, Hazards). Some types of wetlands, such as vernal pools, are permanently affected by changes in soil permeability or drainage. The extent of wetlands affected by a project is usually small compared with the total project footprint, but highly dependent on the final project design. Since final designs have not been prepared for most WSIP projects, the acreage of affected wetlands is not specified in this analysis, but would be determined during project-level CEQA review. The majority of WSIP projects also have the potential to affect seasonal wetlands under state or federal jurisdiction. In addition, pending the outcome of recent cases in federal court, some man-made depressions where water collects for long periods of time may be considered jurisdictional and, in addition, may have the potential to support key special-status invertebrates. Permanent freshwater and saline wetlands could be affected by those projects located in salt marsh or freshwater habitats, but few projects are near these relatively rare habitats. Vernal pools would be permanently affected by excavation or substantial alteration of the soil surface. Even with subsequent compaction, such activity would alter the slow soil permeability upon which vernal pool hydrology depends.

Because wetlands, especially small seasonal wetlands, could occur on almost any facility site, impacts on wetlands are assumed to occur for all WSIP projects that involve surface disturbance. For those projects restricted to sites that are already surfaced, drained, landscaped, or maintained free of vegetation, the potential for impacts on wetlands is low but cannot be entirely ruled out. Once the WSIP projects have undergone preliminary design and biological surveys have been conducted, some of these projects could be determined to have no impact on wetland resources, in which case no mitigation would be required. If impacts on wetlands would occur, further analysis and permitting would be required. Potential impacts on wetlands, by facility type, are described below.

Pipelines. The standard pipeline installation method proposed for the WSIP projects is the open-cut trench method. In environmentally sensitive areas such as creeks, “trenchless” construction techniques such as jack-and-bore or microtunneling could be utilized. Where pipeline installation or replacement is not required, sliplining might be possible. For the open-cut trench method, the construction area would extend for the length of the pipeline and would have a width dependent on the size of the pipe. For trenchless pipeline construction and sliplining, vehicle access and a work area would be required for each pit or entry point. Some land would be temporarily used for construction or staging areas, while a small amount would be permanently committed to

accessways, valves, and other control structures. Wetlands would be temporarily affected in construction and staging areas, and permanently affected where habitat is lost. Vernal pools are a special example, because breaking up the impervious or slowly pervious subsoil permanently alters the hydrology of the pool; if this occurred, the vernal pool habitat would be deemed lost, even though post-construction restoration might be able to restore some vernal pool functions and values.

Tunnels. Impacts on wetlands could occur at portals and shaft openings. The construction area at the entry portal would be the largest, as it must accommodate the portal/shaft entry, vehicles, spoils, equipment, and materials storage. Construction areas at exit portals and shaft openings would require vehicle access and a smaller work area. Dewatering of the tunnel during construction sometimes affects the groundwater, resulting in impacts on surface water features such as springs, seeps, and even creeks. Assessment of this impact would require site-specific information on hydrology and project design, which would be developed as part of project-level CEQA review. Tunnels require spoils disposal sites and access from the portal or shaft openings to the disposal site. The spoils disposal site, as well as a portion of the work area at both portals and shafts, would be permanently committed to access, control, and maintenance structures; permanent loss of wetlands could occur in these areas.

Valves, Valve Lots, and Crossovers. Valves, valve lots, and crossovers are located along existing pipelines and already have developed vehicular access. WSIP projects sited in developed areas that are drained and maintained free of vegetation would not affect wetlands. Projects in undeveloped areas could affect seasonal wetlands. Crossover facilities must be sited near creeks so they can discharge large volumes of water into the watercourse during regular maintenance and during emergency situations. The discharge of water from crossover facilities could cause erosion, temporary out-of-season flooding of the stream channel, loss of wetland and riparian vegetation, and mortality of aquatic organisms dislodged by the high flows.

Pump Stations. New pump stations that would replace existing pump stations (on sites that are surfaced, drained, and maintained free of vegetation) would not affect wetlands. However, if the surfaces at existing pump stations collect soil and standing water, the potential exists for species that live in temporary ponds to establish themselves. New stations on natural habitat could result in temporary and permanent habitat loss, particularly of seasonal wetlands.

Treatment Facilities. WSIP treatment facility projects in developed areas (on sites that are surfaced, drained, and maintained free of vegetation) would not affect wetlands. If natural habitat were affected, impacts on seasonal wetlands could occur (temporary impacts in the work area and permanent impacts where buildings, surfacing, or other facilities are constructed). If it were necessary to install pipelines to connect treatment facilities to the rest of the Hetch Hetchy system, the same type of impacts discussed above in the pipeline section could occur.

Storage Facilities. WSIP storage facility projects would involve the construction or improvement of storage reservoirs and dams. Improvements to below-grade storage reservoirs would require extensive grading and structural work, and it could be necessary to haul material offsite for disposal. Construction activity in areas of natural vegetation could result in impacts on seasonal wetlands. Dam improvements would involve extensive earthmoving activities around the dam as

well as the development of borrow areas, disposal areas, and access roads. These projects would result in temporary construction impacts on the impounded stream and its associated riparian vegetation, and permanent loss of riparian habitat where facilities and access roads are sited. Also, raising or lowering reservoir water levels could inundate existing wetlands or allow them to dry out. This impact of WSIP operations is discussed in Chapter 5.

San Joaquin Region

Impact 4.6-1: Impacts on wetlands and aquatic resources		
Advanced Disinfection	SJ-1	PSM
Lawrence Livermore	SJ-2	PSM
SJPL System	SJ-3	PSM
SJPL Rehabilitation	SJ-4	PSM
Tesla Portal Disinfection	SJ-5	PSM

All five of the projects in this region have the potential to affect at least small areas of seasonal wetlands. The Advanced Disinfection (SJ-1) and Tesla Portal Disinfection (SJ-5) projects would be located in the vicinity of Tesla Portal in largely developed area. Only a small portion of this project site could support seasonal wetlands. However, both projects would generate spoils requiring offsite disposal. The location and area required for spoils disposal have not been determined, so impacts on wetlands are conservatively considered to be *potentially significant*. The Lawrence Livermore (SJ-2) project could also affect small seasonal wetlands or watercourses at the facility sites or along access roads if they required improvements, resulting in *potentially significant* impacts.

The SJPL System (SJ-3) project would construct approximately 16 miles of pipeline and two crossovers, while the SJPL Rehabilitation (SJ-4) project would rehabilitate the existing pipelines at discrete locations. The pipeline construction area for both projects would be partially located on previously disturbed areas and partially on undisturbed areas of the right-of-way, because the work area must be located to the side of the existing pipelines. As a result, vernal pools in the eastern grasslands, alkaline meadows in the floodplains of the San Joaquin River, and other small seasonal wetlands throughout the pipeline route could be temporarily or permanently lost due to construction. Such impacts would be *potentially significant* for the SJPL System and SJPL Rehabilitation projects due to the presence of vernal pools and riparian areas within the project rights-of-way. However, pipeline rehabilitation work under the SJPL Rehabilitation project would occur primarily on previously disturbed lands, and the potential for impacts on vernal pools, small seasonal wetlands, or riparian habitats would be less than under the SJPL System project. In addition, these projects could adversely affect wetlands associated with the San Joaquin River and several other watercourses and their corresponding wetland, riparian, and aquatic life. Potential impacts on riparian areas would be greatly reduced through the proposed use of trenchless construction methods across permanent creeks and creeks with riparian vegetation. Crossovers associated with the SJPL System project may be located at watercourses, and construction could affect wetlands in these areas.

Taken as a whole, the San Joaquin Region projects would result in surface disturbance of 100 to 400 acres in construction areas (99 percent attributable to the SJPL System project, SJ-3, although the extent of construction under SJPL Rehabilitation project, SJ-4, is unknown); these projects would generate approximately 357,000 cubic yards of spoils (99 to 100 percent attributable to the

SJPL System project, and not including the SJPL Rehabilitation project). The location and extent of spoils disposal has not been determined, so the potential impacts on wetlands cannot be analyzed at the program level. Tunneling where feasible would minimize impacts on river and creek resources.

SFPUC Construction Measure #8 (biological screening survey) would be implemented for all projects to determine whether any wetlands could be affected by proposed development. Measures 4.6-1a and 4.6-1b call for assessment, avoidance, restoration, and, in the case of permanent impacts, compensatory creation or enhancement to ensure no net loss of wetlands. Implementation of Measures 4.6-1a and 4.6-1b could reduce *potentially significant* impacts to a less-than-significant level for the Advanced Disinfection (SJ-1), Lawrence Livermore (SJ-2), and Tesla Portal Disinfection (SJ-5) projects.

Substantial wetland resource impacts could occur under the SJPL System project (SJ-3) and the SJPL Rehabilitation project (SJ-4). For projects that could not avoid impacts on wetlands, compensation would be implemented as appropriate to ensure no net loss. An example of a mechanism for compensating wetland loss is the proposed Habitat Reserve Program (HRP), described in Chapter 3 as a related activity under the WSIP. The HRP proposes a variety of means to identify, protect, restore, and manage wetland resources as compensation for WSIP impacts.[16] Implementation of SFPUC Construction Measure #8 and Measures 4.6-1a and 4.6-1b would reduce potential impacts from all San Joaquin Region projects to a less-than-significant level. Potential impacts on wetlands will be evaluated in more detail as part of separate, project-level CEQA review.

Sunol Valley Region

Impact 4.6-1: Impacts on wetlands and aquatic resources		
Alameda Creek Fishery	SV-1	PSM
Calaveras Dam	SV-2	PSM
40-mgd Treated Water	SV-3	PSM
New Irvington Tunnel	SV-4	PSM
Treated Water Reservoirs	SV-5	PSM
SABUP	SV-6	PSM

All of the projects in this region have the potential to affect small areas of seasonal wetlands. The Alameda Creek Fishery project (SV-1) would likely involve construction of pipeline, pumps, collection wells, control structures, and a recapture facility in and near Alameda Creek, downstream from Calaveras Dam. Since it would be situated in and near Alameda Creek, this project could result in *potentially significant* impacts on wetlands and associated vegetation. The volume of spoils generated by this project has not been determined, and the location and area required for spoils disposal have not been identified. The design and nature of the facilities would determine the extent of impacts on wetland and aquatic resources and whether a nationwide or individual Corps permit would be required.

16 The proposed HRP is one of a number of options for achieving the same mitigation goal, and in the absence of the HRP, project-level CEQA review would be required to identify and provide for distinct, project-specific mitigation actions.

The Calaveras Dam project (SV-2) would affect about 100 acres of habitat in the construction area, including portions of Calaveras Creek downstream from the existing dam and portions of Alameda Creek in the vicinity of the Alameda Creek Diversion Dam. Approximately 220 acres of land would be disturbed during the acquisition of borrow material and for spoils disposal. Surface disturbance and alteration of natural surface contours at the construction area would cause impacts on seasonal or permanent wetlands such as freshwater marsh, freshwater seeps, and perennial and seasonal streams, including several hundred linear feet of Calaveras Creek below the existing dam. This project would result in the temporary loss of wetlands and associated aquatic and riparian habitat in the construction area. Riparian and aquatic habitat loss would be permanent at the dam and associated facility sites and in borrow and spoils disposal areas. In addition, seasonal and permanent wetlands that have developed in the area between the existing and proposed reservoir elevations could become more or less permanently inundated (see Section 5.4.6 for a discussion of impacts related to Calaveras Dam operations). The impact of constructing the Calaveras Dam project on wetland resources would be *potentially significant*, but could be minimized through project siting, avoidance of sensitive resources to the extent possible, revegetation of temporarily disturbed areas, and compensatory habitat creation or enhancement in the case of permanent impacts (also see Section 5.4.6 for an analysis of system operations impacts on wetlands and other sensitive habitats).

The 40-mgd Treated Water project (SV-3) would have a construction footprint of 1.5 acres and a final footprint of about 1 acre. This facility would be situated on or near the Sunol Valley Water Treatment Plant (WTP) site, primarily on previously disturbed grasslands. Seasonal wetlands could be present in this area, but they would be man-made and very limited in extent. This project would generate an estimated 100,000 cubic yards of spoils. The location and area required for spoils disposal have not been determined, but could result in impacts on wetlands. Construction grading, erosion, and sedimentation could potentially affect the wetlands and riparian vegetation along adjacent areas of Alameda Creek. The proposed two miles of pipeline to the Alameda Siphons or New Irvington Tunnel as part of this project could affect wetland and aquatic resources along several ephemeral streams. Siting the 40-mgd Treated Water project to avoid the wetland and riparian resources at Alameda Creek could avoid significant impacts on wetlands. However, the two-mile pipeline must either cross steep terrain and several ephemeral tributaries of Alameda Creek, or be situated in the floodplain of Alameda Creek. Either location could cause a *potentially significant* impact on wetland resources.

Under the New Irvington Tunnel project (SV-4), construction of facilities at the proposed tunnel portals south of the Alameda West and Irvington Portals, as well as land required for access roads, shafts, control structures, and a spoils disposal area, could permanently affect seasonal and permanent wetlands. In addition, seasonal wetlands could be temporarily affected in the construction area. The construction footprint at the proposed tunnel portal in the Sunol Valley would be located primarily in uplands; however, impacts could extend to seasonal or permanent wetland or riparian resources near Alameda Creek. The construction area required for this project is estimated at 127 acres, with most spoils to be disposed of onsite. The location of any offsite spoils disposal areas and associated access routes have not been determined. Taken together, the impacts on wetlands would be *potentially significant* for this project.

The Treated Water Reservoirs project (SV-5) would require installation of a 0.3-mile pipeline, including a pipe bridge across Alameda Creek; it would have a construction footprint of 10.5 acres and a final footprint of 3.2 acres. This project would generate a spoils volume of 300,000 cubic yards, although the location and extent of land required for spoils disposal have not been identified for this WSIP. The Treated Water Reservoirs project would result in *potentially significant* temporary and permanent losses of wetland and aquatic habitat in and near Alameda Creek near the Sunol Valley WTP and elsewhere, depending on the location of spoils disposal.

The SABUP project (SV-6) would closely parallel (but would not cross) San Antonio Creek. This project would install 2.3 miles of backup pipeline and would include a new discharge structure in San Antonio Creek and about 1,000 feet of pipeline from Alameda East Portal to Alameda Creek, ending with an energy dissipation structure in Alameda Creek. The construction and permanent placement of such structures would affect these watercourses, and the installation of pipeline could affect ephemeral watercourses and small seasonal wetlands along the proposed alignment. As indicated previously, construction in riparian areas would cause temporary impacts, and the placement of facilities within wetland or aquatic habitat would cause permanent impacts. Siting the SABUP project along existing graded access roads would reduce impacts on wetlands. This project would also generate an estimated net 37,000 cubic yards of spoils. The location and extent of the area required for spoils disposal have not been determined, but could result in a *potentially significant* impact on wetlands and aquatic resources.

Since all WSIP PEIR projects in this region could have a significant impact on wetlands, SFPUC Construction Measure #8 (biological screening survey) would be required to determine the presence and potential impact on wetlands. For projects on SFPUC watershed lands, Construction Measure #8 would ensure consistency with the Alameda WMP. Impacts on permanent creeks and creeks with riparian vegetation would be minimized through the use of trenchless construction methods, which are proposed for crossing such creeks. As mentioned above, these projects are subject to separate, project-level CEQA review, which will evaluate potential impacts in more detail and determine appropriate mitigation measures based on the presence of sensitive biological resources. A wetlands assessment and implementation of avoidance, protection, restoration, and compensation (Measures 4.6-1a and 4.6-1b), would be implemented as appropriate. Taken together, SFPUC Construction Measure #8 and Measures 4.6-1a and 4.6-1b would reduce these potentially significant impacts to a less-than-significant level.

Bay Division Region

Impact 4.6-1: Impacts on wetlands and aquatic resources		
BDPL Reliability Upgrade	BD-1	PSM
BDPL 3 and 4 Crossovers	BD-2	PSM
BDPL 3 and 4 Seismic Upgrade at Hayward Fault	BD-3	PSM

Of the three projects in this region, the BDPL Reliability Upgrade project (BD-1) has the greatest potential to affect small seasonal wetlands. This project would consist of about 16 miles of pipeline and 5 miles of tunnel. The pipeline segment would cross several modified creek channels and artificial flood control channels between the Irvington Portal and Newark Valve House. This pipeline could affect degraded saline emergent wetland habitat near the valve houses at the edge of San Francisco Bay,

especially at the Newark Valve House where the staging area would be located for the tunnel segment of the pipeline. West of the bay, the pipeline would cross two urbanized flood control channels and one natural stream course. Depending on the extent of pipeline requiring upgrades, construction for this project would affect from 82 to 164 acres. In addition, spoils generated by this project are estimated at 614,000 cubic yards. Some of the spoils from the tunnel could be placed in one or more former salt evaporation ponds that are being restored. While there might be temporary impacts on wetlands associated with placing the spoils, the spoils could be used as part of the restoration effort and could therefore have a long-term beneficial impact. Other spoils might be disposed of at other locations, but the extent of any disposal areas has not been determined. The typical construction scenario for pipelines (presented in Chapter 3, Section 3.10.1) indicates that trenchless construction methods would be used to cross beneath streams and avoid sensitive habitats such as salt marsh, and that unpaved affected areas would be graded and revegetated following construction. The proposed use of trenchless construction methods across permanent creeks and creeks with riparian vegetation would reduce potential impacts, but impacts on riparian vegetation could still occur due to construction activity at the tunneling sites. Therefore, the BDPL Reliability Upgrade project would have a *potentially significant* impact on wetlands and aquatic resources.

The BDPL 3 and 4 Crossovers project (BD-2) would affect a minimum of 0.4 acre and could affect wetlands and aquatic resources associated with the Guadalupe River, Barron Creek, and Bear Gulch Reservoir during construction. The effect on wetlands would be temporary, except for the permanent loss of habitat associated with the small vaults and discharge pipes installed at each of the crossovers to enable discharge for maintenance or emergencies. Although small, these impacts would be *potentially significant*.

The BDPL 3 and 4 Seismic Upgrade at the Hayward Fault (BD-3) would involve construction or replacement of up to three miles of pipeline in the vicinity of I-680 and Mission Boulevard in Fremont. The extent of the construction area and spoils disposal sites has not been determined. The proposed use of trenchless methods for creek crossings would reduce the potential impact on these aquatic resources. Although the wetland resources in this area have been highly modified, impacts are considered *potentially significant* pending further analysis.

SFPUC Construction Measure #8 (biological screening survey) would be implemented for all WSIP projects to determine the extent of impacts on wetlands and aquatic resources. Impacts on permanent creeks and creeks with riparian vegetation would be minimized through the proposed use of trenchless construction methods across such creeks. Where wetland resources are present, Measure 4.6-1a calls for a wetland assessment, and Measure 4.6-1b would provide for identifying, preserving, creating, enhancing, and managing compensation lands, as appropriate to fully compensate for temporary and permanent loss of wetlands. Taken together, these measures would reduce impacts on wetlands to a less-than-significant level.

Peninsula Region

Impact 4.6-1: Impacts on wetlands and aquatic resources		
Baden and San Pedro Valve Lots	PN-1	LS
CS/SA Transmission	PN-2	PSM
HTWTP Long-Term	PN-3	LS
Lower Crystal Springs Dam	PN-4	PSM
Pulgas Balancing Reservoir	PN-5	PSM

Most of the projects in this region have the potential to affect small seasonal wetlands. It should be noted that the acreage of potentially affected area has not been determined for any of these projects.

The Baden and San Pedro Valve Lots project (PN-1) is located primarily on maintained, surfaced land, with some access areas on well-sloped, disturbed land that cannot support wetlands. The HTWTP Long-Term project (PN-3) would be located entirely on maintained, surfaced land. Therefore, impacts on wetlands under these two projects would be *less than significant* if all activity is limited to graded, paved, and drained sites that are maintained free of vegetation, or areas that do not contain wetland characteristics.

The CS/SA Transmission project (PN-2) would consist of repairing or replacing 4.5 miles of pipeline and 0.5 mile of tunnel between the Lower Crystal Springs and San Andreas Reservoirs. This project would cause *potentially significant* temporary impacts on wetlands, including freshwater emergent wetlands, and on riparian resources at stream crossings where existing facilities would be replaced, such as the culverts connecting Upper and Lower Crystal Springs Reservoirs and outlet structures and tunnels at Crystal Springs Dam. In addition, impacts on riparian wetlands could occur where the pipeline crosses streams. The acreage of required construction area and the location and extent of borrow or spoils areas have not been determined, and impacts on wetlands will be analyzed in more detail as part of separate, project-level CEQA review for this project.

The Lower Crystal Springs Dam project (PN-4) could adversely affect creek and riparian resources along San Mateo Creek if work areas are needed at the base of the dam. If the stilling basin area at the base of the dam is reconstructed, the freshwater marsh habitat would be lost, a *potentially significant* impact. This project would generate 21,000 cubic yards of spoils; disposal of this volume could affect wetlands if any watercourses or wetlands are located at the spoils disposal site. Operationally, this project would allow Upper and Lower Crystal Springs Reservoirs to be maintained at historical levels, which are higher than the prevailing reservoir levels. This impact of WSIP operations is discussed in Section 5.5.6.

The Pulgas Balancing Reservoir project (PN-5) would affect streams at pipeline crossings and could affect limited freshwater emergent wetland habitat, a *potentially significant* impact. Potential impacts on wetlands and aquatic resources would be evaluated in more detail as part of separate, project-level CEQA review for these projects. Impacts on permanent creeks and creeks with riparian vegetation would be minimized through the proposed use of trenchless construction methods across such creeks.

Implementation of SFPUC Construction Measure #8 (biological screening survey) calls for an initial screening of all project sites for sensitive wetland and aquatic resources. If wetland resources were present, performance of wetlands assessment and avoidance, protection, restoration, and compensation for the lost wetlands and aquatic resources would be required (Measures 4.6-1a and 4.6-1b). Taken together, these measures would reduce wetlands impacts for all Peninsula Region projects to a less-than-significant level.

San Francisco Region

Impact 4.6-1: Impacts on wetlands and aquatic resources		
SAPL 3 Installation	SF-1	PSM
Groundwater Projects	SF-2	PSM
Recycled Water Projects	SF-3	PSM

All three projects in this region have the potential to affect small seasonal wetlands, either directly in construction areas or in spoils disposal areas, a *potentially significant* impact. The SAPL 3 Installation project (SF-1) consists of about four miles of pipeline through predominantly urban and developed areas, but would generate an estimated 44,000 cubic yards of spoils. The location and extent of spoils disposal areas have not been determined. The Groundwater Projects (SF-2) would affect Lake Merced by raising its water level, a potentially beneficial impact. It could also affect wetlands and stream crossings at undetermined locations, totaling 0.6 acre in western San Francisco and northern San Mateo County. The Recycled Water Projects (SF-3) would install 20 miles of pipeline; it would require an estimated five to seven acres for construction and would generate an estimated 47,200 cubic yards of spoils. The location and extent of the construction areas and spoils disposal areas have not been determined. This project could affect larger wetlands, depending on the locations of proposed pipeline, treatment, and storage facilities.

Impacts on any identified permanent creeks and creeks with riparian vegetation would be reduced through the proposed use of trenchless construction methods to cross such creeks. The potential impacts associated with the SAPL 3 Installation project (SF-1), Groundwater Projects (SF-2), and Recycled Water Projects (SF-3) would be evaluated as part of separate, project-level CEQA review. SFPUC Construction Measure #8 (biological screening survey) would be implemented for all WSIP projects to determine whether biological resources could be affected, including wetland and aquatic resources. If jurisdictional wetlands were identified at any of these sites, performance of a wetlands assessment and avoidance, protection, restoration, and compensation for the loss of wetlands would be required (Measures 4.6-1a and 4.6-1b). Taken together, SFPUC Construction Measure #8 and Measures 4.6-1a and 4.61b would reduce wetlands impacts for all three WSIP projects in this region to a less-than-significant level.

Impact 4.6-2: Impacts on sensitive habitats,[17] common habitats, and heritage trees.

For the purpose of this analysis, sensitive habitats include sensitive natural communities, as defined by Holland (1986), and USFWS-defined critical habitats for listed species. Many of the sensitive habitats that could be affected by WSIP implementation are wetlands or are associated with wetlands, such as vernal pools, riparian habitats, and alkali meadows; wetland-related impacts are discussed above under Impact 4.6-1. Impact 4.6-2 addresses non-wetland-related sensitive habitats, such as native grasslands, and also applies to the full extent of the sensitive habitat (e.g., the outer canopy of riparian trees and shrubs).

More common or widespread habitats would also be affected, such as ruderal (or weedy) areas and non-native grassland. As discussed above, impacts on common habitats must be extensive to be considered significant. To determine the level of impact, the estimated amounts of total ground disturbance displayed in Table 4.6-3 were used as a general guide to conclude that impacts on common habitats would not be significant if the extent of the construction area and expected volume of borrow and spoils were small. These numbers would be refined and partitioned among habitat types as part of separate, project-level CEQA review for the individual WSIP projects. Impacts on sensitive habitats also include the disturbance or removal of large, old, or historically important trees. For example, Alameda County protects heritage trees, and the CCSF has specific prohibitions against the removal of street trees and landmark trees. These trees are collectively referred to in this section as heritage trees. Also included in the loss of sensitive habitats are impacts on critical habitat for listed species, as described above and mapped in Figure 4.6-2. Impacts and mitigations do not vary by region, except with respect to the species associated with critical habitats. Potential impacts on sensitive habitats, by facility type, are described below.

Project- and site-specific impacts would be analyzed when more detailed project design information is developed, especially with regard to access, construction and staging areas, location and extent of borrow areas, and spoils disposal areas. Such impacts would be analyzed as part of separate, project-level CEQA review for those projects that could result in potentially significant impacts on sensitive natural communities and habitats.

Pipelines. Pipelines could affect sensitive habitats through temporary and permanent disturbance as well as loss of rare natural communities and critical habitat. As linear features, pipelines cannot avoid these sensitive resources entirely. Where pipelines are constructed using the open-trench method, the trench, work area, spoils pile, and vehicle lanes must be cleared. In addition to the direct loss of heritage trees and other sensitive habitat along the pipeline route, nearby trees could be killed due to root damage. Trenching and stockpiling soil could have an adverse impact on nearby trees if the roots were cut or the drainage altered. If trenching occurred within the dripline of a tree, large roots would likely be damaged. Other construction activity, such as vehicle traffic, under the dripline of trees could compact the soil and damage the roots. Piling soil against tree trunks could also alter the drainage around trees, potentially resulting in disease or death. The right-of-way would be maintained as annual vegetation, so heritage trees or sensitive habitat supporting trees or shrubs could be permanently affected. Trenching, clearing, and soil

[17] Sensitive habitats include critical habitat for listed species.

compaction associated with open-trench construction can permanently alter the soil structure, causing vernal pools and alkali meadows to be permanently lost. With trenchless methods, a larger work area would be developed at the openings of tunnels or jack-and-bore pits, but sensitive habitats would not be affected between these work areas. Trenchless methods would be used where sensitive habitats must be avoided.

Tunnels. Impacts on sensitive habitats or heritage trees could occur at portals, shaft openings and accessways, associated staging areas, and spoils disposal sites. Sensitive habitats in the construction area would be temporarily affected, while sensitive habitats at the tunnel openings used for operational activity would be permanently affected. Impacts on areas that are maintained as access roads to shafts would also be permanent. Compacting or disturbing soil within the dripline of a tree or piling soil against the trunk of a tree could affect the tree, potentially resulting in disease or death.

Valves, Valve Lots, and Crossovers. Valves, valve lots, and crossovers could remove sensitive habitats and heritage trees; however, projects located at existing developed sites would have little impact on adjacent resources, except for potential root damage to nearby large trees, as described for pipelines and tunnels. Valves and crossovers located at watercourse crossings could require the removal of trees and other sensitive riparian vegetation.

Pump Stations. The proposed replacement of pump stations at developed sites would generally not affect sensitive habitats or heritage trees, except for potential root damage to nearby trees. New pump stations could result in temporary and permanent loss of sensitive habitats, similar to impacts described above for pipelines and tunnels.

Treatment Facilities. In general, proposed treatment facility projects would be located in developed areas that are surfaced, drained, and maintained free of vegetation and would not affect sensitive habitats or heritage trees, except for potential root damage to nearby large trees. Treatment facilities sited in areas of natural vegetation could affect heritage trees and sensitive habitats, as discussed above. Some treatment facility projects would require pipelines; if pipelines are located outside of developed areas, these projects could affect sensitive habitats.

Storage Facilities. Construction or improvement of storage reservoirs and dams could affect nearby sensitive habitats through direct temporary and permanent loss of habitat and heritage trees. Improvements to below-grade storage reservoirs could affect large ornamental trees (which in San Francisco could meet the requirements for protection under city ordinance), and construction activities could harm the roots of nearby trees. Construction of new storage reservoirs and dams, depending on their location, could cause extensive impacts on sensitive habitats and heritage trees. Sensitive habitats would be permanently lost within the zone of inundation and in the area required for the impoundment, control structures, and accessways. Permanent loss of sensitive habitat could also occur in borrow and spoils disposal areas as well as their associated accessways. Restoration of certain types of sensitive habitats, such as riparian vegetation, might be possible in some construction, borrow, and spoils disposal areas. Storage facilities are often located in bottomlands, which contain such sensitive habitat types as sycamore

alluvial woodland and riparian forest and scrub communities. Impacts on sensitive habitats during operation of the WSIP projects are discussed in Chapter 5.

San Joaquin Region

Impact 4.6-2: Impacts on sensitive habitats, common habitats, and heritage trees		
Advanced Disinfection	SJ-1	PSM
Lawrence Livermore	SJ-2	PSM
SJPL System	SJ-3	PSM
SJPL Rehabilitation	SJ-4	PSM
Tesla Portal Disinfection	SJ-5	PSM

There is a limited potential for sensitive habitat impacts under the Advanced Disinfection (SJ-1) and Tesla Portal Disinfection (SJ-5) projects because of their location in previously developed and non-native-dominated areas with few native trees. However, the Lawrence Livermore project (SJ-2) could affect small areas of sensitive valley needlegrass grassland and pine bluegrass grassland natural communities in the hills west of Tesla Portal. Also, the Advanced Disinfection and Tesla Portal Disinfection projects would generate significant volumes of spoils requiring offsite disposal. The location of spoils disposal has not been determined, so this impact on sensitive habitats is conservatively considered to be *potentially significant.* This impact will be evaluated in more detail as part of separate, project-level CEQA review for these projects.

The eastern portion of the SJPL System project (SJ-3) would affect potentially large areas of non-native grassland and oak woodland, and smaller areas of the sensitive natural communities northern hardpan vernal pool and valley needlegrass grassland. If the pipeline crosses the San Joaquin River and floodplain in the central section of the valley, it could affect relatively small areas of sensitive natural communities, including alkaline meadow, coastal and valley freshwater marsh, Great Valley cottonwood forest, Great Valley mixed riparian forest, Great Valley oak riparian forest, Great Valley willow scrub, and elderberry savanna. The extent of potential impacts in this area would depend on the project design and methods for crossing the river. Where open-trench construction is used, a portion of the construction area would be located on previously undisturbed habitat. Because of their dependence on natural soil conditions, northern hardpan vernal pool and alkaline meadow communities in these areas could be permanently affected by any soil disturbance. Valley needlegrass grassland and riparian natural communities could be temporarily affected by pipeline construction and work/staging areas and could be permanently affected by roads and control structures. Although the potentially affected areas would be fairly small, the remaining acreage of these communities is so limited in extent that the impact would be *potentially significant*. Stanislaus County has no heritage tree protection ordinance, so the loss of large trees such as isolated blue oaks or valley oaks would not be considered significant. This project would pass through critical habitat for Colusa grass in the eastern rolling foothills, and critical habitat for the Conservancy fairy shrimp in the alkaline grasslands near the San Joaquin River. The area required for spoils disposal could affect sensitive habitats or heritage trees.

The SJPL Rehabilitation project (SJ-4) could affect areas where pipeline repair or replacement is needed. Since this project encompasses the entire San Joaquin portion of the Hetch Hetchy Aqueduct, impacts could occur on any of the sensitive natural communities described for the SJPL System project (SJ-3), including riparian forests and scrubs, vernal pools, and grasslands, as

well as the established critical habitat units for Colusa grass and Conservancy fairy shrimp. The area required for spoils disposal could affect sensitive habitats or heritage trees. The impact of this project on sensitive habitats is *potentially significant*.

Implementation of SFPUC Construction Measure #8 (biological screening survey) would ensure that all potentially affected areas would be surveyed for biological resources, including heritage trees, sensitive natural communities, and critical habitats. If sensitive habitats were present, onsite avoidance, protection, and restoration for impacts would be required, including compensation for heritage trees, as appropriate (Measure 4.6-2). As described above under Impact 4.6-1, in Measure 4.6-1b the WSIP HRP or similar offsite compensation would provide a mechanism for identifying, preserving, creating, enhancing, and managing compensation lands, as appropriate, although mitigation actions would be implemented on a project-by-project basis. Taken together, SFPUC Construction Measure #8, Measure 4.6-1b, and Measure 4.6-2 would reduce potential impacts on sensitive habitats to a less-than-significant level.

Sunol Valley Region

Impact 4.6-2: Impacts on sensitive habitats, common habitats, and heritage trees

Alameda Creek Fishery	SV-1	PSM
Calaveras Dam	SV-2	PSM
40-mgd Treated Water	SV-3	PSM
New Irvington Tunnel	SV-4	PSM
Treated Water Reservoirs	SV-5	PSM
SABUP	SV-6	PSM

Most of the projects in the Sunol Valley Region have the potential to affect one or more sensitive riparian habitats and to result in the loss of large native trees. All of the Sunol Valley Region projects are situated in critical habitat for one or more listed species. Some of the projects would also affect large areas of relatively common habitats.

The Alameda Creek Fishery (SV-1) and Calaveras Dam (SV-2) projects would affect relatively large areas of sensitive riparian natural communities, including central coast cottonwood sycamore riparian forest, central coast arroyo willow riparian forest, central coast riparian scrub, and sycamore alluvial woodland. Areas of serpentine grassland below Calaveras Dam and east of Calaveras Reservoir could be affected during dam reconstruction. Relatively small areas of these sensitive natural communities would be committed to permanent facilities and accessways for the Alameda Creek Fishery project, and most project impacts on these communities are assumed to be temporary construction impacts. The Calaveras Dam project would result in the permanent loss of sensitive riparian natural communities in the vicinity of the new dam and associated facilities and accessways, as well as the temporary loss of these communities in construction and staging areas. Although the borrow and spoils disposal areas have not been identified, riparian communities (such as coast live oak riparian forest, central coast arroyo willow riparian forest, or central coast riparian scrub) could be permanently lost to accommodate them. Established critical habitat in the Sunol Valley includes the area between Arroyo Hondo and Calaveras Reservoir (for California tiger salamander) and the area between the Alameda Creek Diversion Dam, Calaveras Reservoir and San Antonio Reservoir (for Alameda whipsnake). Critical habitat for California tiger salamander could be affected by the construction, borrow, or spoils disposal areas associated with the Calaveras Dam project. Alameda whipsnake critical habitat encompasses all of the Sunol Valley Region projects. Relatively large areas of common habitats, such as non-native annual grassland, oak woodland,

and coastal scrub, could also be affected by the Calaveras Dam construction, borrow, and spoils disposal areas. The Alameda Creek Fishery project could result in impacts on smaller areas of these common habitats.

The remaining WSIP projects in this region (40-mgd Treated Water, SV-3; New Irvington Tunnel, SV-4; Treated Water Reservoirs, SV-5; and SABUP, SV-6) would affect riparian forest and alluvial woodland, including coast live oak riparian forest, central coast arroyo willow forest, and sycamore alluvial woodland where the project facilities would cross Alameda Creek or its floodplain and tributaries. These sensitive natural communities would be permanently lost to storage facilities, control buildings, accessways, pipelines, outfalls, and, in the case of the New Irvington Tunnel, spoils disposal. Temporary loss of sensitive riparian and alluvial natural communities would occur in construction and staging areas. Critical habitat for the Alameda whipsnake could be lost under any of these projects. Common habitats such as non-native annual grassland, oak woodland, and coastal scrub could also be affected by these projects, especially the New Irvington Tunnel, which would have a project footprint estimated at 127 acres. Impacts on sensitive habitats would be *potentially significant* for each WSIP project in this region due to the presence of critical habitat, sensitive riparian and serpentine grassland habitats, and the size of the project footprints, including spoils disposal.

Implementation of SFPUC Construction Measure #8 (biological screening survey) would be required for all WSIP projects to determine the presence of sensitive habitats. If the survey identified sensitive habitats, heritage trees, or critical habitat, further mitigation would be required. Measure 4.6-2 would ensure onsite avoidance, minimization of the impact area, protection, restoration of habitats, and replacement of lost trees, including heritage trees, as appropriate. In Measure 4.6-1b, the WSIP HRP or similar program would provide a mechanism for offsite identification, protection, restoration, and management of compensation land (although not necessarily outside of lands already managed by the SFPUC). Mitigation actions could be implemented on a project-by-project basis or on a more comprehensive basis. Taken together, these measures would reduce impacts to a less-than-significant level.

Bay Division Region

Impact 4.6-2: Impacts on sensitive habitats, common habitats, and heritage trees		
BDPL Reliability Upgrade	BD-1	PSM
BDPL 3 and 4 Crossovers	BD-2	PSM
BDPL 3 and 4 Seismic Upgrade at Hayward Fault	BD-3	PSM

The largest project in this region, the BDPL Reliability Upgrade project (BD-1), would cross several natural watercourses and could affect the associated riparian communities, which could include central coast riparian scrub or central coast arroyo willow forest. This project could also affect somewhat disturbed examples of northern coastal salt marsh and coastal and valley freshwater marsh in the vicinity of the Newark and Ravenswood Valve Houses. Most if not all of the salt marsh would be avoided, however, due to the use of a tunnel under San Francisco Bay. Spoils disposal could affect sensitive habitats, although some of the spoils could be used to enhance San Francisco Bay wetland habitat. Some heritage trees could also be lost as a result of pipeline construction. The BDPL Reliability Upgrade project would cross critical habitat for Central California DPS

steelhead in the Guadalupe River, Coyote Creek, and San Francisquito Creek. Although not identified as critical habitat for steelhead, Stevens Creek, San Mateo Creek, and several smaller streams still support populations of this species. The Guadalupe River also supports a small run of Chinook salmon. Common habitats that could be significantly affected include non-native grassland and oak woodland. The impact of this project would be *potentially significant.*

The BDPL 3 and 4 Crossovers project (BD-2) would cause limited impacts on maintained coast and valley freshwater marsh and central coast riparian scrub (or a similar natural riparian vegetation community) within the Guadalupe River floodplain. Construction could remove a small number of native oaks at Barron Creek and Bear Gulch Reservoir, some of which could meet criteria for heritage trees. Since this project involves construction at the Guadalupe River, impacts on steelhead critical habitat and Chinook salmon sensitive habitat could occur, such as erosion and sedimentation at the discharge outfall; therefore, the impact of this project would be *potentially significant.*

The BDPL 3 and 4 Seismic Upgrade at Hayward Fault project (BD-3) would cross one or more highly modified creek channels and flood control channels that support limited riparian vegetation and few trees, so the potential impact of this project on sensitive habitats in the construction area would be small. The volume of spoils has not been determined for this project, so the impact of this project on sensitive habitats is conservatively considered to be *potentially significant*.

SFPUC Construction Measure #8 (biological screening survey) would be required for all WSIP projects to determine whether sensitive habitats were present. If so, additional mitigation would be required to ensure avoidance, protection, restoration, and replacement of heritage trees (Measure 4.6-2). In Measure 4.6-1b, additional compensation would be implemented through the WSIP HRP or similar mechanism to provide for the identification, protection, restoration, and management of compensation lands, although mitigation actions would be implemented on a project-by-project basis. Taken together, SFPUC Construction Measure #8, Measure 4.6-1b, and Measure 4.6-2 would reduce potential impacts on sensitive habitats resulting from Bay Division Region projects to a less-than-significant level.

Peninsula Region

Impact 4.6-2: Impacts on sensitive habitats, common habitats, and heritage trees

Baden and San Pedro Valve Lots	PN-1	PSM
CS/SA Transmission	PN-2	PSM
HTWTP Long-Term	PN-3	LS
Lower Crystal Springs Dam	PN-4	PSM
Pulgas Balancing Reservoir	PN-5	PSM

The HTWTP Long-Term project (PN-3) would be sited within a surfaced, drained site that is landscaped or maintained free of vegetation. Therefore, this project is not expected to affect sensitive habitats and would have a limited potential to affect nearby heritage trees. Implementation of SFPUC Construction Measure #8 would be adequate to ensure impacts on sensitive resources are *less than significant*.

The Baden and San Pedro Valve Lots project (PN-1) is located primarily on graded, drained, and surfaced sites, but also includes some small elements in more or less natural habitat where heritage trees could be affected, a *potentially significant* impact. The CS/SA Transmission project (PN-2) would affect coastal and valley freshwater marsh at Upper and Lower Crystal Springs Reservoirs at the culverts between the reservoirs and at several outlet sites, as well as potentially at the base of Crystal Springs Dam where freshwater marsh vegetation has grown around old, existing structures. In addition, repair and replacement of segments of the Crystal Springs/San Andreas Pipeline could affect one or more types of sensitive natural communities, such as central coast riparian forest at watercourse crossings and along the trace of San Mateo Creek between San Andreas and Lower Crystal Springs Reservoirs. The location and extent of spoils disposal have not been determined, but could affect sensitive habitats, including heritage trees. The extent of this impact would be analyzed in more detail following the pipeline assessment and completion of project-level CEQA review. Impacts of the CS/SA Transmission project are also considered *potentially significant.*

The Lower Crystal Springs Dam project (PN-4) would affect coastal and valley freshwater marsh and potentially central coast riparian forest at the stilling basin at the base of the dam. Areas of serpentine grassland could be affected by construction of this project. The construction area and staging areas have not been identified, but depending on their size and location could cause impacts on heritage trees. This project could affect critical habitat for California red-legged frog. Common habitats would also be affected by these projects, including non-native grassland, coastal scrub, and oak woodland. Impacts of the Lower Crystal Springs Dam project would be *potentially significant.* (The impacts of project operation, including the impact of raising water levels at Upper and Lower Crystal Springs Reservoirs, are discussed in Chapter 5.)

The Pulgas Balancing Reservoir project (PN-5) would require the removal of trees that could meet heritage tree criteria and could affect sensitive natural communities such as central coast riparian forest and willow riparian forest along the smaller ephemeral watercourses where the pipeline to the Pulgas Water Temple is proposed. Areas of oak woodland and non-native grassland could also be affected, although much of the route traversed by this project would pass through maintained, landscaped areas around the Pulgas Water Temple. The impact of this project would be *potentially significant.*

SFPUC Measure #8 would be implemented for all projects in this region to screen for sensitive resources; if sensitive habitats were present, additional mitigation would be required to ensure that identified resources would be avoided, protected, and restored to the extent possible. Measure 4.6-2 would ensure that onsite sensitive habitats were avoided, protected, and restored to the extent possible, and also would provide compensation for the loss of heritage trees. If further compensation were required, Measure 4.6-1b specifies the WSIP HRP or similar program as a mechanism for habitat compensation, although mitigation actions would be implemented on a project-by-project basis. Taken together, SFPUC Construction Measure #8, Measure 4.6-1b, and Measure 4.6-2 would reduce the potentially significant impacts from Peninsula Region projects to a less-than-significant level.

San Francisco Region

Impact 4.6-2: Impacts on sensitive habitats, common habitats, and heritage trees		
SAPL 3 Installation	SF-1	PSM
Groundwater Projects	SF-2	PSM
Recycled Water Projects	SF-3	PSM

All projects in this region (SAPL 3 Installation, SF-1; Groundwater Projects, SF-2; and Recycled Water Projects, SF-3) could affect heritage trees, a *potentially significant* impact. The location of spoils disposal for the SAPL 3 Installation project could affect sensitive habitats. The locations of facilities, construction areas, and spoils disposal areas, as needed, have not been determined for the Groundwater and Recycled Water Projects. Implementation of SFPUC Construction Measure #8 would ensure that all project sites are screened for the occurrence of sensitive habitats, including heritage trees. If sensitive habitats were present, additional mitigation would be required, including onsite habitat restoration/tree replacement measures, avoidance of sensitive resources, and protection, as appropriate (Measure 4.6-2). If additional compensation were required, Measure 4.6-1b specifies the WSIP HRP as one potential mechanism to provide for the identification, protection, restoration, and management of compensation land, as appropriate. Taken together, SFPUC Construction Measure #8, Measure 4.6-1b, and Measure 4.6-2 would reduce impacts from San Francisco Region projects to a less-than-significant level.

Impact 4.6-3: Impacts on key special-status species – direct mortality and/or habitat effects.

Most of the WSIP projects would affect natural habitats (such as grasslands, seasonal or permanent wetlands and watercourses, and oak woodland) or disturbed habitat that could support one or more key special-status species. As a result, all projects would be evaluated to determine their potential to affect these resources. Some projects are likely to be sited largely or entirely on surfaced, drained areas that are maintained free of vegetation, in which case these projects could have no impact or a less-than-significant impact on sensitive species. However, not all WSIP project designs have been finalized. Potential impacts on key special-status species, by facility type, are described below.

For projects where key special-status species or their habitat would be affected, avoidance is the foremost impact minimization measure. Avoidance would consist of siting the project to avoid habitat, to the extent possible; fencing or other measures to limit the construction footprint and reduce interaction between construction activity and individual animals; timing construction to avoid interrupting the reproductive season; and monitoring to ensure no take of species during construction. Where loss of habitat is inevitable, mitigation measures include actively or passively relocating animals and salvaging key special-status plants. The loss of key special-status species and their habitat would require compensatory measures, such as restoring habitat in the construction footprint, restoring degraded or lost habitat outside the construction area, and protecting existing, high-quality habitat elsewhere, which could be accomplished through acquisition, management agreement, conservation easement, or other measures. The WSIP HRP outlines a potential programmatic approach to habitat compensation.

Consultation with the USFWS, NMFS, and CDFG, as appropriate, would be initiated on a project-by-project basis for those WSIP projects that could affect listed species.

It should be noted that there would be effects not only on key special-status species discussed herein, but also on other species of concern (see the introduction to this section), such as California species of special concern, federal candidate species, CNPS List 1 plants (rare and endangered), and List 2 plants (rare but not endangered). Many of these species would also benefit from mitigation measures developed for listed species, although the impact on each species and appropriate mitigation must be analyzed at the project level during separate CEQA review.

Pipelines. Trenching and other soil disturbance has the potential to cause direct mortality of key special-status plants and their seed accumulated in the soil. Key special-status animals could be killed by vehicles and equipment, their burrows or other retreats could be crushed, or they could be killed if they fall into trenches or pits and cannot escape. Trenching and other surface-disturbing activity could dry out the streams, wetlands, or seasonal ponds in which aquatic animals live, or the pools in which the larval stages of amphibians develop. Sediment or other pollutants could cause mortality to aquatic animals in streams at and below the construction areas. Fish could be stranded as a result of dewatering (leading to suffocation or exposure to birds, raccoons, and other predators attracted to dewatered areas), or they could be trampled or crushed by humans, vehicles, or other equipment. The noise, dust, and traffic caused by construction activity could also cause breeding animals to abandon their nests or their young. The loss of habitat would be temporary in construction areas that could be fully restored to their original vegetation. The loss of habitat would be permanent in areas permanently committed to project facilities, or when the habitat could not be fully restored, such as vernal pools. During operation of the WSIP projects, wildlife could be affected by ongoing vehicle activity along pipeline accessways, and by erosion, sedimentation, or other pollution of waterways; reptiles and amphibians would be especially vulnerable.

Tunnels. As with pipelines, direct mortality of individual key special-status species could result from interactions with vehicles and equipment or the removal of individual plants and their seed in the soil during construction. The area of surface disturbance for tunnels would be more restricted than for pipelines and would be limited to tunnel shafts or portals. However, dewatering during tunnel construction could alter the hydrology of nearby surface features, such as ponds, seeps, springs, and creeks on which certain key special-status animal species depend. Vehicle activity to and from spoils disposal sites presents a high risk of mortality to key special-status animals, particularly reptiles and amphibians. Also, noise would occur 24 hours per day at tunnel entry shafts/portals, potentially causing more intensive disturbance to key special-status wildlife species. Temporary and permanent loss of habitat would occur as discussed above for pipelines. Temporary and permanent impacts could result from habitat loss due to spoils disposal. During operation, ongoing vehicle activity could be a cause of mortality, especially for reptiles and amphibians. Nesting birds are unlikely to be affected by vehicle activity and noise, as they would become accustomed to the activity.

Valves, Valve Lots, and Crossovers. Valves and valve lot projects could be sited in existing maintenance yards that are surfaced, drained, and maintained free of vegetation. These projects could affect key special-status species if the construction area were expanded into natural vegetation. Crossover facilities must be sited near creeks, so they would have a high potential to cause direct mortality to animals and plants that depend on aquatic habitats. Dispersing animals could move across valve lots and crossovers from nearby natural habitat, even if little or no cover were present, resulting in direct mortality to animals in the construction area. Temporary and permanent loss of habitat would occur as discussed above for pipelines. During project operation, releases from crossovers into watercourses could cause scouring and result in thermal shock for sensitive species that depend on aquatic habitats.

Pump Stations. New pump stations sited at existing developed pump station sites that are surfaced, drained, and maintained free of vegetation would not affect key special-status species unless construction activity were extended into areas of natural vegetation, or if key special-status animals moved into the construction area from nearby natural habitat. If new pump stations were located within natural habitat, project activities could result in direct mortality of key special-status species and temporary and permanent loss of habitat, as discussed above for pipelines. Impacts during project operation on key special-status wildlife species are expected to be insignificant, because wildlife would become accustomed to pump station operations and activity.

Treatment Facilities. Proposed treatment facility projects sited in developed areas that are surfaced, drained, and maintained free of vegetation would have a low potential to affect key special-status species unless construction were extended into areas of natural vegetation. However, some treatment facilities are situated near extensive areas of natural, high-quality habitat, such as the Sunol Valley and the Peninsula watershed. Animals could move into the construction area from nearby habitat and could be killed by moving vehicles and equipment, by falling into trenches or pits, or by dewatering of aquatic habitat on which the species depend. Noise could result in the abandonment of nests or other breeding areas used by key special-status animals. Locating treatment facilities in natural, undisturbed habitats would have a greater risk of causing direct mortality to key special-status species. Temporary and permanent loss of habitat would occur as discussed above for pipelines. Operationally, vehicle activity at treatment facilities could result in roadkills, especially of slow-moving reptiles and amphibians.

Storage Facilities. Storage reservoirs requiring extensive grading could cause direct mortality of key special-status animals due to moving vehicles and equipment, animals falling into pits or trenches, and dewatering of aquatic habitat. Construction of facilities in areas surrounded by extensive urban development would have a low potential to affect key special-status species. Dam improvements involving extensive earthmoving activities near streams and associated riparian vegetation have a high potential to cause mortality of key special-status species that depend on these habitats. Temporary and permanent loss of habitat would occur as discussed above for pipelines.

San Joaquin Region

Impact 4.6-3: Impacts on key special-status species – direct mortality and/or habitat effects		
Advanced Disinfection	SJ-1	PSM
Lawrence Livermore	SJ-2	PSM
SJPL System	SJ-3	PSM
SJPL Rehabilitation	SJ-4	PSM
Tesla Portal Disinfection	SJ-5	PSM

All five projects in this region (Advanced Disinfection, SJ-1; Lawrence Livermore, SJ-2; SJPL System, SJ-3; SJPL Rehabilitation, SJ-4; and Tesla Portal Disinfection, SJ-5) would be located within the habitat and range of the following key special-status species: San Joaquin kit fox, vernal pool crustaceans, Swainson's hawk, burrowing owl, California red-legged frog, and California tiger salamander. Impacts on key special-status species would be *potentially significant* for all of the projects in this region.

Construction activity at Tesla Portal for the Advanced Disinfection and Tesla Portal Disinfection projects and associated spoils disposal activity could cause direct mortality of these species, as described above. The Lawrence Livermore project would be located within the range of large-flowered fiddleneck. Construction in natural grassland habitat, such as improving access roads or installing control facilities, could result in direct mortality and permanent loss of habitat for these species.

The SJPL System (SJ-3) and SJPL Rehabilitation (SJ-4) projects could affect the suite of vernal pool plants in the grasslands west of Oakdale Portal, as well as riparian key special-status species such as Valley elderberry longhorn beetle, riparian woodrat, least Bell's vireo, and Delta button-celery. These projects are located within the habitat and range of Central Valley DPS steelhead, green sturgeon, and Chinook salmon, and impacts on these species and their habitat could occur at the San Joaquin River pipeline crossing. Temporary loss of habitat would occur in all construction areas containing habitat for key special-status species. Permanent loss of habitat would occur where new project facilities are sited on habitat for key special-status species and where that habitat is permanently altered, such as vernal pools in the trenching construction area and in spoils disposal areas.

SFPUC Construction Measure #8 (biological screening survey) would be required for all WSIP projects in this region to identify potentially occurring key special-status species and their habitat. If the screening survey identified the potential for key special-status species to be affected, then additional surveys would be carried out to determine the presence and extent of key special-status species, the extent of project impacts, and measures to avoid or reduce these potential impacts as much as possible (Measure 4.6-3a, first bullet). If impacts would occur, applicable standard programmatic measures (Measure 4.6-3b, as modified for each project) would be implemented to compensate for these impacts. If additional compensation were required, Measure 4.6-1b provides for identifying, preserving, creating, enhancing, and managing compensation lands, as appropriate. Taken together, these measures would reduce impacts to a less-than-significant level for key special-status species for all projects in this region.

In addition, SFPUC Construction Measure #8, Measure 4.6-1b, and Measures 4.6-3a and 4.6-3b and project-specific CEQA analysis would identify all other species of concern (such as

California species of special concern, federal candidate species, and CNPS List 1 and 2 plants) that could be affected by a specific project, as well as determine project impacts on these species and establish appropriate avoidance, protection, minimization, and compensation measures.

Sunol Valley Region

Impact 4.6-3: Impacts on key special-status species – direct mortality and/or habitat effects		
Alameda Creek Fishery	SV-1	PSM
Calaveras Dam	SV-2	PSM
40-mgd Treated Water	SV-3	PSM
New Irvington Tunnel	SV-4	PSM
Treated Water Reservoirs	SV-5	PSM
SABUP	SV-6	PSM

Because the Sunol Valley Region projects are located in an area of extensive high-quality habitat for rainbow trout, California red-legged frog, foothill yellow-legged frog, California tiger salamander, Alameda whipsnake, and burrowing owl, construction activity of all projects in this region could cause direct mortality of these species. Temporary loss of habitat could occur in all construction areas. Habitat degradation (such as erosion or sedimentation within aquatic habitats) could result in mortality of individuals and degradation of breeding habitat for aquatic-dependent species. Permanent loss of habitat for key special-status species would occur where new project facilities are sited and where habitat is permanently altered. Impacts on key special-status species would be *potentially significant* for each project in this region (Alameda Creek Fishery, SV-1; Calaveras Dam, SV-2; 40-mgd Treated Water, SV-3; New Irvington Tunnel, SV-4; Treated Water Reservoirs, SV-5; and SABUP, SV-6).

Construction of the Alameda Creek Fishery project (SV-1) would cause a temporary loss of habitat and potential mortality of rainbow trout and other water-dependent species such as California tiger salamander, foothill yellow-legged frog, and California red-legged frog during facility construction. Upland habitat for Alameda whipsnake and burrowing owl could also be lost, and mortality could result from vehicle activity and animals becoming trapped in trenches.

Construction of the Calaveras Dam project (SV-2) would affect riparian and wetland areas, potentially resulting in mortality of individuals and affecting breeding habitat for foothill yellow-legged frog, California red-legged frog, California tiger salamander, and rainbow trout. The project could affect grassland species such as the Callippe silverspot butterfly, which is known to occur near the dam, reservoir, access roads, and borrow and spoils disposal areas. The loss of upland habitats, such as non-native grassland, oak woodland, and coastal scrub, could result in mortality of Alameda whipsnake, burrowing owl, California red-legged frog, and California tiger salamander, species that depend on these upland habitats for portions of their life cycle. Construction activity and noise in and around Calaveras Reservoir could disturb nesting or foraging bald eagles. Construction impacts are usually considered temporary, but habitat loss would be considered permanent unless the habitat could be fully restored. The location of the 220-acre borrow areas have not been identified, but construction activity could affect ponds, non-native grassland, coastal scrub, oak woodlands, and riparian habitat, and thus could result in habitat loss and direct mortality of any of these key special-status species. Impacts related to Calaveras Dam operations are discussed in Section 5.4.6.

Construction of the 40-mgd Treated Water project (SV-3) could temporarily affect habitat for California red-legged frog, foothill yellow-legged frog, California tiger salamander, Alameda whipsnake, burrowing owl, and rainbow trout, since this project would be located adjacent to riparian habitat; the pipeline for this project would cross several small watercourses and would also affect upland habitat supporting non-native grasslands, oak woodland, and coastal scrub. Depending on the final project footprint, a portion of the water treatment facilities and the associated pipeline could result in permanent habitat loss for these species. These facilities would have a minimal additional impact on the movements and dispersal of tiger salamanders, red-legged frogs, yellow-legged frogs, and burrowing owls, because the footprint of the fenced area at the Sunol Valley WTP is expected to be about the same as at present. Construction activity could cause direct mortality of these key special-status species.

The New Irvington Tunnel (SV-4) and SABUP (SV-6) projects would cause a temporary loss of habitats in the construction zone and a permanent loss of habitats where facilities are sited (including accessways and spoils disposal areas), as well as the permanent conversion of forest and woodland habitat for pipelines. These projects could affect foraging habitat for the Callippe silverspot butterfly, breeding and estivation habitat for California red-legged frog and California tiger salamander, breeding and foraging habitat for burrowing owl, and movement corridors for Alameda whipsnake; they could also cause erosion and sedimentation in Alameda Creek and its tributaries, which could affect foothill yellow-legged frog and resident rainbow trout. Dewatering during tunnel construction could alter surface water features such as ponds, seeps, springs, and streams, with potential impacts on associated key special-status species such as California red-legged frog and California tiger salamander.

The Treated Water Reservoirs project (SV-5) would result in about three acres of permanent habitat loss for the new storage and contact basins. This project could temporarily affect habitat in nearby Alameda Creek due to construction of a pipe bridge across the creek, and permanently affect disturbed grassland and oak woodland near the existing Sunol Valley WTP, resulting in habitat loss for California red-legged frog, foothill yellow-legged frog, California tiger salamander, burrowing owl, and Alameda whipsnake. Fencing around the facility would alter movement corridors between uplands and Alameda Creek for California red-legged frogs and California tiger salamanders, a permanent impact. Temporary impacts on rainbow trout habitat in Alameda Creek could occur during construction. Mortality of individual animals, especially red-legged frogs, yellow-legged frogs, and tiger salamanders could occur, both during construction and operation.

SFPUC Construction Measure #8 (biological screening survey) would be required for all WSIP projects in this region to identify potential habitat for key special-status species. Measures 4.6-3a and 4.6-3b call for surveys to verify the presence or absence of key special-status species, a worker awareness program, environmental inspections, protection measures to avoid mortality to individuals during construction and operation of the projects, and restoration of temporary use areas. Measure 4.6-1b would provide a mechanism for identifying, preserving, creating, enhancing, and managing compensation lands, as appropriate to fully compensate for temporary and permanent loss of habitat. Taken together, these measures would reduce impacts on key special-status species to a less-than-significant level for all projects in this region.

In addition, SFPUC Construction Measure #8 and project-specific CEQA analysis would identify all other species of concern (such as California species of special concern, federal candidate species, and CNPS List 1 and 2 plants) that could be affected by a specific project, as well as determine project impacts on these species and appropriate avoidance, protection, minimization, and compensation measures.

Bay Division Region

Impact 4.6-3: Impacts on key special-status species – direct mortality and/or habitat effects		
BDPL Reliability Upgrade	BD-1	PSM
BDPL 3 and 4 Crossovers	BD-2	PSM
BDPL 3 and 4 Seismic Upgrade at Hayward Fault	BD-3	PSM

All of the projects in this region have the potential to affect key special-status species. The BDPL Reliability Upgrade project (BD-1) could affect salt-marsh-dependent key special-status species near San Francisco Bay (such as western snowy plover, California clapper rail, and salt marsh harvest mouse) through roadkills, loss of habitat, and mortality due to dewatering, trenching, and disturbance. Although these impacts could be significant, they would be limited to previously disturbed salt marshes near the Newark and Ravenswood Valve Houses; the Bay Tunnel section of this project would avoid most of the habitat supporting these species. Some of the spoils from the tunnel could be placed in a restoration area at a former salt evaporation pond, and thus could result in a beneficial impact on salt-marsh-dependent sensitive species. Impacts on California red-legged frog, California tiger salamander, and burrowing owl could occur at the stream crossings and in disturbed grasslands, although this habitat is much degraded and fragmented along the pipeline route. The potential for direct mortality during construction is therefore relatively low. Some temporary habitat loss of riparian and grassland habitat would occur during construction. This project could cause sedimentation or other reduction in water quality in the bay and in tributary streams used by spawning anadromous fishes such as the Chinook salmon and Central Coast DPS steelhead. Replacement of Bay Division Pipelines Nos. 3 and 4 could affect vernal pool tadpole shrimp, known to be present in the vicinity of Milpitas, resulting in the loss of habitat and potential mortality of individuals. The western terminus of the Bay Division Pipelines at the entrance to the Pulgas Tunnel is also within the range of the San Francisco garter snake. Therefore, the BDPL Reliability Upgrade project would result in *potentially significant* impacts on key special-status species in this region.

The BDPL 3 and 4 Crossovers project (BD-2) could temporarily affect migration or spawning habitat for Central Coast DPS steelhead in the Guadalupe River due to erosion and sedimentation within the river levees during construction. Temporary habitat loss for California red-legged frog and California tiger salamander could occur at Barron Creek and Bear Creek Reservoir. Although these projects are small in extent, habitat loss and potential mortality of individuals is *potentially significant.* Operationally, large volumes of water are released from the crossover valves for brief periods during maintenance and emergencies. This potential impact on listed species is expected to be less than significant because the increased flows would be short in duration.

The BDPL 3 and 4 Seismic Upgrade at Hayward Fault project (BD-3) could affect California red-legged frog, California tiger salamander, and burrowing owl through loss of habitat as well as

mortality due to construction vehicle activity, dewatering, sedimentation, water quality degradation, trenching, and disturbance. However, the watercourses in this portion of the East Bay are highly modified and support little or no habitat for red-legged frog and tiger salamander. There could be marginal habitat for burrowing owl on the levee banks and disturbed grasslands, so temporary loss of habitat could occur for this species, a *potentially significant* impact.

SFPUC Construction Measure #8 (biological screening survey) would be required for all WSIP projects in this region to identify potential habitat for key special-status species. If the screening survey identified the potential for key special-status species to be affected, then additional measures would be required to avoid, minimize, and compensate for potential impacts. Measure 4.6-3a calls for surveys to determine the presence and extent of key special-status species, the extent of project impacts, and measures to avoid or reduce these potential impacts as much as possible (Measure 4.6-3a, first bullet); it would also require a worker awareness program, environmental inspections, project planning to minimize direct impacts, and onsite restoration. If impacts could occur, applicable standard programmatic measures (Measure 4.6-3b, as modified for each project) would be implemented to compensate for these impacts. If additional compensation were required outside the construction footprint, Measure 4.6-1b would provide for identifying, preserving, creating, enhancing, and managing compensation lands, as appropriate to fully compensate for temporary and permanent loss of habitat. Taken together, these measures would reduce impacts to a less-than-significant level for these projects.

In addition, SFPUC Construction Measure #8 and project-specific CEQA analysis would identify all other sensitive species (such as California species of special concern, federal candidate species, and CNPS List 1 and 2 plants) that could be affected by a specific project, as well as determine impacts on these species from the project and appropriate avoidance, protection, minimization, and compensation measures.

Peninsula Region

Impact 4.6-3: Impacts on key special-status species – direct mortality and/or habitat effects

Baden and San Pedro Valve Lots	PN-1	PSM
CS/SA Transmission	PN-2	PSM
HTWTP Long-Term	PN-3	LS
Lower Crystal Springs Dam	PN-4	PSM
Pulgas Balancing Reservoir	PN-5	PSM

Although the Baden and San Pedro Valve Lots (PN-1) are located on developed sites, some improvements that are part of this project would take place within known habitat for California red-legged frog and San Francisco garter snake, and potential habitat for California tiger salamander. Therefore, the impact from this project would be *potentially significant*.

The CS/SA Transmission project (PN-2) would pass through areas of known habitat for the San Francisco garter snake and California red-legged frog. Although unlikely, potential habitat for California tiger salamander may be present. Construction activity, including staging areas, could temporarily affect aquatic and nearby upland habitat on which these species depend. Direct mortality of individuals from roadkills and heavy equipment activity could occur during construction, both at the culvert repair site at Highway 92 and along the pipeline itself. It is expected that all construction and staging impacts would be temporary for the garter snake and

red-legged frog, since the upland and wetland habitats along Upper and Lower Crystal Springs Reservoirs can be restored. The impact of this project would be *potentially significant*.

The HTWTP Long-Term project (PN-3) would occur entirely on graded, surfaced, or maintained sites, and therefore is not expected to affect key special-status species (*less than significant*).

The Lower Crystal Springs Dam project (PN-4) could affect California red-legged frog and its habitat in the pools and wetlands at the base of the dam, as well as any populations in and around the parapet. Depending on the design of improvements, some of the impacts on this habitat would be permanent and some temporary. Since the area below the dam is potential habitat for San Francisco garter snake, these species also could be impacted by construction activity in and around the stilling basin. Construction or staging areas in San Mateo Creek canyon could result in habitat loss and direct mortality of two key special-status plant species: San Mateo woolly sunflower and Marin western flax. Potential habitat for California tiger salamander may also be present. Disturbance associated with spoils disposal and vehicle activity could result in direct mortality and loss of habitat for any of these key special-status species. Unless restoration can be demonstrated, any impacts would be considered permanent. Any project activity or staging areas at the top of the dam could potentially affect San Francisco garter snake, especially if activity is in or near emergent wetland vegetation along the reservoir margins. Erosion or sedimentation in San Mateo Creek downstream from the dam could result in habitat degradation or mortality of Central Coast DPS steelhead. The impact of the Lower Crystal Springs Dam project would be *potentially significant*. Operation of the project, which would involve raising the reservoir water level to historical elevations, would affect California red-legged frog, San Francisco garter snake, and fountain thistle (which grows at the perimeter of the reservoir). These impacts are discussed in Chapter 5.

Construction of the Pulgas Balancing Reservoir project (PN-5) could affect California red-legged frog, California tiger salamander, and San Francisco garter snake and their habitat. Construction and operation at the existing reservoir site would occur within potential dispersal habitat for California red-legged frog, but this site does not support foraging or breeding habitat for any key special-status species. However, this project also includes improvements to the discharge channel from Pulgas Water Temple to Upper Crystal Springs Reservoir. Construction activity could result in the temporary loss of habitat for California red-legged frog and San Francisco garter snake as well as direct mortality of individuals. Permanent loss of habitat would occur where new project facilities are sited on natural habitat. Direct mortality and loss of habitat could occur as a result of spoils disposal vehicle activity and habitat disturbance. The impact of the Pulgas Balancing Reservoir project would be *potentially significant*.

SFPUC Construction Measure #8 (biological screening survey) would be required for all WSIP projects in this region to determine the presence of habitat for key special-status species. If the screening survey identifies the potential for key special-status species to be affected, then additional surveys would be carried out to determine the presence and extent of suitable habitat, the extent of project impacts, and measures to avoid or reduce these potential impacts as much as possible (Measure 4.6-3a, first bullet). If impacts would occur, applicable standard programmatic

measures (Measure 4.6-3b, as modified for each project) would be implemented to compensate for these impacts. These measures include a worker environmental awareness program, environmental inspections, and minimizing and restoring temporary use areas. If additional compensation were required, Measure 4.6-1b calls for identifying, preserving, creating, enhancing, and managing compensation lands, as appropriate. Taken together, these measures would reduce impacts on key special-status species to a less-than-significant level.

In addition, SFPUC Construction Measure #8 and project-specific CEQA analysis would identify all other sensitive species (such as California species of special concern, federal candidate species, and CNPS List 1 and 2 plants) that could be affected by a specific project, as well as determine impacts on these species from the project and appropriate avoidance, protection, minimization, and compensation measures.

San Francisco Region

Impact 4.6-3: Impacts on key special-status species – direct mortality and/or habitat effects		
SAPL 3 Installation	SF-1	LS
Groundwater Projects	SF-2	LS
Recycled Water Projects	SF-3	LS

The SAPL 3 Installation project (SF-1) consists of about 4.2 miles of pipeline. It is located in urban and developed land. There are no recent records for any listed species in this area, and therefore impacts are expected to be *less than significant*. However, a number of species of concern could be affected by this project, and potential impacts on these species will be analyzed in detail as part of separate, project-level CEQA review for this project.

The Local Groundwater Projects (SF-2) would raise the level of Lake Merced and would involve construction of wells, pumps, and control facilities at various locations in San Francisco. The Regional Groundwater Projects (SF-2) would involve construction of up to 10 wells and 0.5 mile of pipeline to connect the wells with the existing water conveyance system. These facilities would be located in San Mateo County. All project facilities are assumed to be located in previously disturbed areas that do not support key-special-status species. No listed species are known to be present in the area proposed for project facilities, and therefore potential impacts on key special-status species would be *less than significant*, although impacts on other species of concern would be addressed as part of separate, project-level CEQA review for this project.

The Recycled Water Projects (SF-3) would affect five to seven acres and would involve 20 miles of pipeline. All project facilities are assumed to be located in previously disturbed areas that do not support key-special-status species. No listed species are known to be present in the area proposed for project facilities, and therefore potential impacts on key special-status species would be *less than significant*, although impacts on other species of concern would be addressed as part of separate, project-level CEQA review for this project.

SFPUC Construction Measure #8 (biological screening survey) would be required for all WSIP projects in this region to determine the presence of habitat for key special-status species.

Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources.

Construction and operation of many of the WSIP projects would involve discharges of system water to surface waters. These discharges would have the potential to affect riparian and aquatic resources, depending on the water quality, volume, timing, frequency, and location of the discharge. Under the WSIP projects, there could be controlled, uncontrolled, and accidental discharges of chlorinated or chloraminated water into natural water bodies at any of the streams and reservoirs that are integral to or crossed by regional water system facilities. General water quality impacts related to chlorine, chloramine, and ammonia toxicity and to nitrogen loading and algal stimulation are discussed in detail in Section 4.5, Hydrology and Water Quality, Impacts 4.5-3 and 4.5-5 (degradation of surface water quality during construction and operation, respectively).

During construction, discharges of treated water would be required for construction of some WSIP facilities, including discharges of large volumes of water in the existing pipelines or tunnels in order for construction to proceed; these discharges would be required to include control measures to prevent erosion and to protect water quality in accordance with Regional Water Quality Control Board waste discharge requirements or National Pollutant Discharge Elimination System (NPDES) permit (see Section 4.5, Impact 4.5-3b).

Similarly, during operation, the SFPUC would periodically discharge treated water from some facilities (such as treatment plants and crossover facilities), primarily for maintenance or emergency purposes. Aquatic organisms can experience mortality from thermal shock when large quantities of cold water are released into a stream with much warmer water, especially in summer under low-flow conditions. Aquatic organisms also can experience mortality when large quantities of chlorinated or chloraminated water are released into water bodies. During scheduled maintenance, discharges would be dechlorinated or dechloraminated as needed, and would also be required to include control measures to prevent erosion and to protect water quality in accordance with NPDES permits, as described in Section 4.5 under Impact 4.5-5. Thus, the greatest potential for impact would be under emergency conditions when releases are unscheduled and the water may not be fully dechlorinated or dechloraminated. In cases where the discharge would be to rivers, creeks, or other natural water bodies and where sensitive habitat or species could be affected, impacts on biological resources could be avoided or reduced through avoidance, protection, restoration, and compensation for loss of wetlands.

During construction, discharges of untreated surface or groundwater (that is, non-system water) may be required in projects that require dewatering. These project discharges would be subject to NPDES permitting requirements.

In addition, WSIP projects in the Sunol Valley Region would be located in the Alameda Creek watershed (and subject to the Alameda WMP), and some of the WSIP projects in the Peninsula Region would be located in the Peninsula watershed (and subject to the Peninsula WMP). Since these WSIP projects would be required to implement all pertinent watershed management plan policies and actions, this analysis assumes the following action pertaining to dechlorination of water prior to discharge would be implemented as part of the WSIP projects:

- *Action fis6*. Identify and adopt alternative nontoxic management practices for the protection of aquatic resources in coordination with the Integrated Pest Management program. Guidelines include:
  - Dechlorinate water before it is discharged to streams and reservoirs
  - Minimize the use of copper sulfate in the treatment of algal blooms in reservoirs
  - Limit the use of chemical fire retardants and Class A foams (except protein-based foams) in or near aquatic zones

San Joaquin Region

Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources		
Advanced Disinfection	SJ-1	LS
Lawrence Livermore	SJ-2	LS
SJPL System	SJ-3	PSM
SJPL Rehabilitation	SJ-4	PSM
Tesla Portal Disinfection	SJ-5	LS

Construction and operation of the SJPL System project (SJ-3) and construction for rehabilitation of pipelines under the SJPL Rehabilitation project (SJ-4) would require the discharge of water from the regional system. This portion of the pipeline system contains raw water that has not been chlorinated or chloraminated; thus, removal of chlorine or chloramine would not be required. Discharges to water bodies may also be required as part of dewatering during construction. Depending on their magnitude, frequency, and location, construction and operational discharges under these two projects could result in *potentially significant* impacts on riparian or aquatic resources, particularly in the vicinity of the San Joaquin River. These impacts could be avoided or reduced to a less-than-significant level by discharging to drainage systems where feasible, applying control measures required as conditions of NPDES and other regulatory permits, or by implementing Measure 4.6-4 and controlling the nature and timing of discharges to minimize effects on biological resources.

Small discharges of chlorinated water could be required during construction of the Advanced Disinfection (SJ-1), Lawrence Livermore (SJ-2), and Tesla Portal Disinfection (SJ-5) projects, and no new discharges would be expected during operation of these three facilities. Impacts related to construction discharges of raw and treated water from these facilities would be *less than significant* with implementation of control measures, in compliance with NPDES permits or waste discharge requirements, and adherence to the requirements of other regulatory agencies, as described in Section 4.5 for fishery resources.

Sunol Valley Region

Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources		
Alameda Creek Fishery	SV-1	LS
Calaveras Dam	SV-2	LS
40-mgd Treated Water	SV-3	LS
New Irvington Tunnel	SV-4	PSM
Treated Water Reservoirs	SV-5	LS
SABUP	SV-6	LS

Construction of the Alameda Creek Fishery (SV-1) would involve dewatering of Alameda Creek, and return of this water to the creek under best management practices. There would be no discharge of system water during construction or operation and therefore, this impact would be *less than significant*.

Construction of the Calaveras Dam (SV-2) project would involve large amounts of discharge into surface waters from dewatering during construction, and would occur over a long construction period spanning the winter high-flow months. These discharges would be raw, untreated surface water. However, because of the potential for sedimentation during winter storm events, the discharges could contain large amounts of sediments. With implementation of control measures in compliance with NPDES permitting requirements for these discharges, potential impacts to riparian habitat associated with erosion would be *less than significant* (see Section 4.5, Hydrology and Water Quality, Impact 4.5-3a, for more discussion). Impacts related to discharges or releases of water during operation of these facilities are analyzed in Chapter 5, Section 5.4.6.

Small discharges of chloraminated water could be required during construction and operation of improvements to the Sunol Valley WTP for the 40-mgd Treated Water (SV-3) and Treated Water Reservoirs (SV-5) projects. However, these discharges would be managed in compliance with the required water quality permits, as described in Section 4.5, and continuation of existing SFPUC protective measures as well as secondary containment and other design provisions included in the proposed WSIP project designs would ensure that impacts on aquatic habitat associated with discharges or accidental spills would be *less than significant* for these two projects.

Dewatering of the existing tunnel under the New Irvington Tunnel project (SV-4) would require discharges to Alameda Creek, and periodic maintenance during operations might also require discharging system water to the creek. Depending on their magnitude, frequency, and location, these discharges could result in *potentially significant* impacts on riparian or aquatic resources in Alameda Creek, including sensitive habitats and special-status species. These impacts could be avoided or reduced to a less-than-significant level by discharging to drainage systems where feasible, applying control measures required as conditions of NPDES and other regulatory permits, or by implementing Measure 4.6-4, which involves controlling the nature and timing of discharges to minimize effects on biological resources.

The SABUP project (SV-6) would likely require the discharge of chlorinated or chloraminated water during construction, although implementation of control measures in compliance with NPDES permit requirements and the requirements of other regulatory agencies, as described in Section 4.5, would reduce impacts on biological resources. During operation, the SABUP project would include periodic discharges of system water to San Antonio and Alameda Creeks, but this project includes energy dissipation devices to minimize impacts of these discharges on habitat. Since the nature of the operational discharges would be essentially the same as under existing conditions, this impact would be *less than significant*.

Implementation of Alameda WMP Action fis6 regarding the discharge of chlorinated water would also be required for all projects in the Sunol Valley Region. Implementation of this measure, as well as Measure 4.6-4 where appropriate, would reduce impacts to a less-than-significant level.

Bay Division Region

Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources		
BDPL Reliability Upgrade	BD-1	PSM
BDPL 3 and 4 Crossovers	BD-2	PSM
BDPL 3 and 4 Seismic Upgrade at Hayward Fault	BD-3	LS

Construction-related discharges of chloraminated water would be required for all WSIP projects in this region (BDPL Reliability Upgrade, BD-1; BDPL 3 and 4 Crossovers, BD-2; and BDPL 3 and 4 Seismic Upgrade at Hayward Fault, BD-3). Depending on the magnitude and location, these discharges could affect riparian and/or aquatic resources if discharges are directed to creeks, rivers, or other natural water bodies. Implementation of construction control measures in compliance with NPDES and other regulatory permits, including avoidance of discharges to sensitive habitats where feasible, would ensure that construction-related impacts on biological resources are less than significant.

However, the BDPL Reliability Upgrade (BD-1) and BDPL 3 and 4 Crossovers (BD-2) projects would include periodic operational discharges of chloraminated water, generally for maintenance purposes. In particular, the design of the BDPL 3 and 4 Crossovers calls for operational discharges of large volumes of water to an adjacent creek, river, or other water body. Depending on their magnitude, frequency, and location, these discharges could result in *potentially significant* impacts on riparian or aquatic resources, including sensitive habitats and special-status species. Potential adverse impacts include erosion, scouring, and rapid temperature changes in the receiving water body. These impacts could be avoided or reduced to a less-than-significant level by discharging to drainage systems where feasible, implementing of control measures required as conditions of NPDES and other regulatory permits, or by implementing Measure 4.6-4 and controlling the nature and timing of discharges to minimize effects on biological resources. Site-specific mitigation measures would be developed as part of project-level CEQA review on these projects.

The BDPL 3 and 4 Seismic Upgrade at Hayward Fault project (BD-3) would require only construction-related discharges and no operational discharges. As discussed above, this construction-related impact would be *less than significant*.

Peninsula Region

Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources		
Baden and San Pedro Valve Lots	PN-1	LS
CS/SA Transmission	PN-2	LS
HTWTP Long-Term	PN-3	LS
Lower Crystal Springs Dam	PN-4	LS
Pulgas Balancing Reservoir	PN-5	LS

Small discharges of chloraminated water could be required during construction and operation of treatment plant improvements under the Baden and San Pedro Valve Lots (PN-1) and HTWTP Long-Term (PN-3) projects. However, standard control measures for protecting riparian and aquatic resources as well as required water quality control measures would be incorporated into construction and operational procedures. In addition, secondary containment and other design provisions included in these two projects would ensure that impacts on aquatic habitat associated with accidental spills would be less than significant. Therefore, impacts on biological resources due water discharges from these two projects would be *less than significant*.

The CS/SA Transmission (PN-2) and Lower Crystal Springs Dam (PN-4) projects are not expected to require construction or operational discharges of chloraminated water. However, they may require extensive dewatering for long construction periods and are located in areas of sensitive wetlands. With implementation of control measures required as conditions of NPDES and other regulatory permits and the Peninsula WMP Action fis6 regarding the discharge of chlorinated water, this impact would be *less than significant* for these two projects. Impacts related to discharges or releases of water during operation of the Lower Crystal Springs Dam are analyzed in Chapter 5, Section 5.5.6.

The Pulgas Balancing Reservoir project (PN-5) includes improvements to the Pulgas Discharge Channel. This area has already experienced erosion due to ongoing discharge flows into Upper Crystal Springs Reservoir without sufficient energy dissipation. Changes in discharge flow patterns under the WSIP could incrementally increase erosion at the discharge point and this area contains sensitive habitats and species. With implementation of control measures required as conditions of NPDES and other regulatory permits, potential impacts associated with erosion would be *less than significant* (see Section 4.5, Hydrology and Water Quality, Impact 4.5-5, for more discussion). Potential impacts associated with construction or operational discharges of chloraminated water would be less than significant since this project, located within the Peninsula watershed, would be required to implement Peninsula WMP Action fis6 regarding the discharge of chlorinated water.

San Francisco Region

Impact 4.6-4: Water discharge effects on riparian and/or aquatic resources		
SAPL 3 Installation	SF-1	N/A
Groundwater Projects	SF-2	N/A
Recycled Water Projects	SF-3	N/A

No construction or operational discharges of system water would be expected under the SAPL 3 Installation project (SF-1), Groundwater Projects (SF-2), and Recycled Water Projects (SF-3). Therefore, this impact would *not apply* to these projects.

Impact 4.6-5: Conflicts with the provisions of adopted conservation plans or other approved biological resources plans.

The adopted conservation plans described in the Regulatory Framework section were reviewed to determine whether the WSIP would conflict with the plans' provisions. The adopted plans include *San Joaquin River National Wildlife Refuge Comprehensive Conservation Plan* and the *San Joaquin County Multi-Species Habitat Conservation and Open Space Plan*. Two WSIP projects, the SJPL System (SJ-3) and SJPL Rehabilitation (SJ-4) could have *potentially significant* impacts on resources within the San Joaquin River NWR planning area, including impacts on riparian restoration areas, native perennial grasslands, and seasonal wetlands. SFPUC Construction Measure #8 (biological screening survey) and avoidance, minimization and compensation measures for biological resources as discussed in Measures 4.6-1a, 4.6-1b, 4.6-2, 4.6-3a, and 4.6-3b would be implemented to reduce impacts on biological resources to a less-than-significant

level. SFPUC would negotiate with the refuge owner, USFWS, to determine specific actions to fully compensate for impacts within the San Joaquin NWR to ensure no net loss of extent or function of biological resources. Implementation of this agreement would ensure that project implementation would occur in a manner consistent with the provisions of the NWR Comprehensive Conservation Plan. Regarding the *San Joaquin County Multi-Species Habitat Conservation and Open Space Plan,* CCSF is not a signatory to the plan, so the WSIP would not be covered under the plan's incidental take permit or compensation mechanism. From a county-wide perspective, impacts from the WSIP within the plan area (San Joaquin County) are sufficiently small that they would not preclude implementation of the plan or protection of the covered species.

All six of the projects in the Sunol Valley Region and four of the five project in the Peninsula Region (PN-1, 2, 4, and 5) are situated within the SFPUC's Alameda and Peninsula Watershed Management Plan areas. These plans specifically provide for Hetch Hetchy system-wide improvements, and also identify avoidance, protection and compensation measures for biological resources. Therefore, impacts from these projects on biological resources would be consistent with these plans and the impacts would be *less than significant.*

There are no other adopted plans that affect the other WSIP projects, thus this impact is *not applicable* for the other 10 WSIP facility improvement projects. The CCSF will, as part of preparing project-specific CEQA documentation, evaluate project consistency with the provisions of any other relevant HCPs adopted subsequent to publication of the PEIR.

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