9 Vegetation, Wetlands, and Wildlife Resources

This chapter addresses terrestrial biological resources that are known or have the potential to occur in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (Project) area and describes the potential effects of the Project alternatives on those resources. Terrestrial biological resources include common vegetation and habitat types, sensitive plant communities, and special-status plant and animal species. Aquatic resources and fisheries are addressed in Chapter 8. The analysis provided in this chapter includes a description of existing environmental conditions, the methods used to assess environmental effects, the potential direct and indirect impacts of the Project alternatives, and mitigation measures recommended to address adverse effects under the National Environmental Policy Act (NEPA) and significant impacts under the California Environmental Quality Act (CEQA). Federal, State of California (State), and local regulations that pertain to biological resources are summarized in this chapter.

9.1 Environmental Setting/Affected Environment

The Yolo Bypass is a leveed, 59,000-acre floodplain on the west side of the lower Sacramento River in California's Yolo and Solano counties. The Yolo Bypass is located within the boundaries and levees of the Sacramento River Flood Control Project and is the primary component that carries floodwaters from several northern California waterways to the Sacramento-San Joaquin Delta (Delta). These waterways include the Sacramento, Feather, and American rivers and their associated tributary watersheds. Tributaries specific to the Yolo Bypass include Cache and Putah creeks, Willow Slough, and Knights Landing Ridge Cut from the Colusa Basin (Jones and Stokes 2001). Floodplain ecology and bypass hydrology are described in further detail in Section 8.1.3 of Chapter 8, *Aquatic Resources and Fisheries*.

For the purpose of this Environmental Impact Statement/Environmental Impact Report (EIS/EIR), the Yolo Bypass comprises two main geographical sections: an upper 14.2-mile section (measured north to south) between Fremont Weir and the Interstate 80 (I-80) causeway (the northern portion of the Yolo Bypass) and a lower 26.8-mile section (measured north to south) between the I-80 causeway and the southern end of Egbert Tract (the southern portion of the Yolo Bypass). The northern portion of the Yolo Bypass is nontidal and bounded on the east by Tule Canal (the upper extension of the Toe Drain) and the east bypass levee and on the west by the west bypass levee. The I-5 causeway bisects the northern portion of the Yolo Bypass east to west.

The southern portion of the Yolo Bypass is bounded on the east by the Toe Drain and the east bypass levee (also considered the west levee of the Sacramento River Deep Water Ship Channel, downstream of the northwest corner of Prospect Island). At this location, the southern portion of the Yolo Bypass extends east to include Prospect Island although the east bypass levee remains intact along the west edge of Prospect Island. South of Prospect Island, the east side of the southern portion of the Yolo Bypass extends downstream of the confluence of Cache and

Lindsey sloughs to the downstream boundary of Egbert Tract (Jones and Stokes 2001). This eastern downstream limit of the southern portion of the Yolo Bypass is roughly co-located with the confluence of Steamboat and Cache sloughs.

The west side of the southern portion of the Yolo Bypass is bounded by the west bypass levee to just south of Putah Creek and Putah Creek Sink located downstream of Putah Creek. The southern portion of the Yolo Bypass does not have a levee on the west side for about eight miles. The lack of levees allows floodwaters to flow unimpeded as far west as Yolo County Road (CR) 104 (Jones and Stokes 2001). Farther downstream (about one mile north of Yolo CR 155), the west bypass levee resumes and extends south and west of Liberty Island. The west side of the southern portion of the Yolo Bypass extends farther south, downstream of Liberty Island, and along the western boundary of Egbert Tract (Jones and Stokes 2001).

The southern portion of the Yolo Bypass, which lies within the legally defined Delta, is tidally influenced in some areas. Tidal conditions are routinely measured as far upstream in the Toe Drain as the I-80 causeway. The 3,660-acre California Department of Fish and Wildlife (CDFW) Yolo Bypass Wildlife Area (YBWA) is situated predominantly south of I-80 in the upper reach of the southern portion of the Yolo Bypass (Jones and Stokes 2001). As previously described, the southern limit of the Project area extends to the southern boundary of Egbert Tract. However, because of limitations in available map data, figures in this EIS/EIR do not fully capture the southernmost portion of the Project area south of Liberty Island, including Prospect Island. There are no construction features proposed in this area.

The Project area includes areas in the Yolo Bypass that have been identified for ground disturbance. Most of the direct impacts associated with ground disturbance would occur in the northern portion of the Yolo Bypass in the Fremont Weir Wildlife Area (FWWA). Fremont Weir and the FWWA are the northernmost extent of the Yolo Bypass. Fremont Weir was completed in 1924; it is the first overflow structure on the Sacramento River's southern bank and marks the beginning of the Yolo Bypass. Fremont Weir is located 15 miles northwest of Sacramento and eight miles northeast of Woodland. The weir's primary purpose is to release overflow waters of the Sacramento River, the Sutter Bypass, and the Feather River into the Yolo Bypass. The crest elevation is 32 feet referenced to the North American Vertical Datum of 1988 (California Data Exchange Center 2017), and the design capacity of the weir is 343,000 cubic feet per second (cfs) (California Department of Water Resources [DWR] 2010).

The Yolo Bypass provides flood control; more specifically, it conveys flood flows generated by runoff from the entire Sacramento River watershed. Within this flood management context, most of the land in the Yolo Bypass is farmed, with a smaller amount (located mainly in the southern portion of the Yolo Bypass) dedicated to publicly and privately managed wetlands. Land use within the Yolo Bypass is restricted by easements held through the Sacramento-San Joaquin Drainage District, as amended by the State of California Reclamation Board (Jones and Stokes 2001). However, these easements do not restrict the use of land in the Yolo Bypass for agricultural and managed wetland (duck club) activities.

Those portions of the Yolo Bypass that are flooded in winter and early spring also function as a migration route and spawning and rearing habitat for many sensitive special-status fish species endemic to the region (as defined by the Federal Endangered Species Act [ESA] and the California Endangered Species Act [CESA]), as discussed further in Chapter 8, *Aquatic Resources and Fisheries*). This migration connection occurs when floodwaters are spilling over

Fremont and Sacramento weirs, creating an upstream hydrologic connection between the Yolo Bypass and Sacramento River. As the floodwaters inundate and then recede, the Yolo Bypass also provides habitat for shorebirds, waterfowl, and terrestrial species (Jones and Stokes 2001). Large areas in the bypass are currently managed for wildlife habitat, including the YBWA, Conaway Ranch, and private duck club lands in the southern section of the bypass (Jones and Stokes 2001).

The topography in the Yolo Bypass is mostly flat since the area is located on a terrace within the natural floodplain of the Sacramento River. The bypass generally slopes from higher elevations in the north to lower elevations in the south and from higher elevations in the west to lower in the east. The elevation in the northern portion of the Yolo Bypass ranges from 20 to 32 feet above mean sea level while elevations in the southern portion range from 5 to 15 feet above mean sea level. The current topographic features and landforms in the Yolo Bypass are largely a product of anthropogenic (human) alterations to the natural system (California Department of Fish and Game [CDFG] 2008). The construction of dams and levees, management of water releases, and grading of topography to convert the historic floodplain to agricultural land has caused substantial changes to the natural topography. The primary topographic features now include human-made levees, trestles, and berms (CDFG 2008).

9.1.1 Vegetation Communities and Habitats

Vegetation communities were derived from the geographic information system (GIS) information in the *Fine-Scale Riparian Vegetation Mapping of the Central Valley Flood Protection Plan Area Final Report* (CDFW 2013), with modifications made during 2014 "ground-truthing" surveys conducted by DWR and HDR, Inc. (HDR) over a portion of the survey area (primarily the northern and eastern parts of the FWWA along the old river oxbow, Sacramento River, and Tule Canal) where access permitted. The vegetation and land use classification system generally follows that developed for the Delta by CDFW (Hickson and Keeler-Wolf 2007). The CDFW system follows Sawyer et al. (2009), which is consistent with the National Vegetation Classification System for the United States (Grossman et al. 1998).

Appendix H1 shows the vegetation communities in the Yolo Bypass.

Table 9-1. summarizes the acreages of vegetation communities and land cover types in the construction study area; these vegetation communities are described in further detail following the table. The biological resources construction study area for all project alternatives includes the area of temporary and permanent disturbance plus a 100-foot buffer. Lists of commonly associated wildlife species provided in the vegetation community descriptions were based on California Wildlife Habitat Relationship descriptions (Mayer and Laudenslayer 1988) and field observations.

Table 9-2 summarizes the acreages of vegetation communities and land cover types in the operations study area (Yolo Bypass). However, detailed descriptions of these vegetation communities are not provided in this EIS/EIR.

Table 9-1. Vegetation Communities in the Construction Study Area

Vegetation Community	Alt. 1 (acres)	Alt. 2 (acres)	Alt. 3 (acres)	Alt. 4 (acres)	Alt. 5 (acres)	Alt. 6 (acres)
Annual and Perennial Grassland	**60.8**	**146.9**	**115.0**	**228.5**	**166.1**	**133.0**
California annual herb/grassland	0.8	40.0	41.7	41.7	63.9	58.6
California naturalized annual and perennial grassland	60.0	106.8	73.3	186.8	102.1	74.4
Freshwater Aquatic Vegetation	**6.9**	**9.5**	**9.5**	**10.2**	**4.2**	**9.7**
Temperate freshwater floating mat	3.1	3.1	3.1	3.1	2.0	3.1
Water primrose wetlands (semi-natural stands)	3.8	6.4	6.4	7.0	2.2	6.6
Freshwater Emergent Wetland	**28.8**	**26.7**	**28.2**	**141.6**	**10.6**	**28.3**
California and hardstem bulrush marsh	28.0	25.9	25.9	25.9	9.8	26.0
Managed annual wetland vegetation	0.8	0.8	2.3	115.8	0.8	2.3
Freshwater Seeps and Meadows	**0.0**	**0.0**	**6.6**	**6.6**	**0.0**	**7.1**
Douglas' mugwort patches	0.0	0.0	6.6	6.6	0.0	7.1
Riparian Forest/Woodland	**38.1**	**42.0**	**49.2**	**77.2**	**31.6**	**53.3**
Black willow thicket	0.9	1.1	1.1	10.0	1.9	1.1
Box elder forest	0.0	0.0	1.5	1.5	0.0	2.3
Fremont cottonwood forest	28.9	31.5	36.5	54.8	22.9	38.5
Mixed hardwood forest	0.0	0.0	0.0	0.9	0.0	0.0
Valley oak woodland	8.3	9.4	10.1	10.1	6.8	11.4
Riparian Scrub	**0.0**	**0.7**	**0.0**	**<0.1**	**0.7**	**0.0**
Himalayan blackberry brambles	0.0	0.7	0.0	0.0	0.7	0.0
Sandbar willow thicket	0.0	0.0	0.0	<0.1	0.0	0.0
Other	**12.4**	**17.8**	**11.3**	**172.6**	**11.0**	**13.8**
Agriculture	9.6	3.7	4.8	135.2	0.8	4.9
Open Water	2.8	14.1	6.5	37.5	10.2	8.9
Total	**147.0**	**243.6**	**219.8**	**636.7**	**224.2**	**238.1**

Table 9-2. Vegetation Communities in the Operations Study Area

Vegetation Community	Yolo Bypass (acres)
Annual and Perennial Grassland	**7,149**
California annual herb/grassland	3,115
California naturalized annual and perennial grassland	4,034
Coastal Scrub	**6**
Coyote brush scrub	6
Freshwater Aquatic Vegetation	**134**
Temperate freshwater floating mat	56
Water primrose wetlands (semi-natural stands)	78

Vegetation Community	Yolo Bypass (acres)
Freshwater Emergent Wetland	**8,123**
California and hardstem bulrush marsh	1,558
Cattail marsh	23
Common reed marsh	8
Managed annual wetland vegetation	4,743
Seasonally flooded grassland	1,428
Submerged aquatic vegetation	1
Vernal pool complex	51
Wet meadows	311
Freshwater Seeps and Meadows	**7**
Douglas' mugwort patches	7
Riparian Forest/Woodland	**861**
Black willow thicket	349
Box elder forest	7
California sycamore woodland	1
Fremont cottonwood forest	251
Hinds's walnut and related stands	3
Oregon ash grove	4
Red osier thicket	3
Seasonally flooded forest	4
Valley oak woodland	157
White alder grove	77
Unspecified	5
Riparian Scrub	**374**
Arroyo willow thicket	148
Button willow thicket	1
California rose briar patches	1
Himalayan blackberry brambles	13
Sandbar willow thicket	209
Seasonally flooded riparian scrub	2
Saline Emergent Wetland	**6,036**
Alkali heath marsh	2
Baltic rush marsh	6
Managed alkali wetland (*Crypsis*)	1,620
Perennial pepper weed patches	201
Salt grass flats	4,207
Other	**37,770**

Vegetation Community	Yolo Bypass (acres)
Agriculture	31,731
Barren	31
Eucalyptus grove	1
Open Water	5,807
Ornamental	31
Urban	169
Total	**60,460**

9.1.1.1 Agriculture

Agricultural lands in the study area include areas that are cultivated for a variety of crops. Cropland consists of major crops and cover types in agricultural production, including alfalfa grown in Conaway Ranch (provides foraging habitat for Swainson's Hawk, *Buteo swainsoni*, and Tricolored Blackbird, *Agelaius tricolor*), sunflowers (provide foraging habitat for Tricolored Blackbird), rice, corn, milo, sorghum, millet, safflower, tomatoes, and irrigated pastures (provide foraging habitat for Tricolored Blackbird). Fallow fields provide important foraging habitat for Swainson's Hawk. Non-cropland includes agricultural areas used for cattle grazing, small roads and ditches, and non-planted areas associated with cultivated lands (DWR 2013).

Cultivated crops include grain and seed crops as well as row crops and silage. Grain and seed crops are annual grasses that are grown in dense stands such as corn. Because the dense growth makes it difficult to move through these fields, most of the wildlife values are derived during the early growing period and especially following the harvest when waste grain is accessible to waterfowl and other birds such as Sandhill Cranes (*Grus canadensis*).

Although generally of lesser value to wildlife than native habitats, row crop and silage fields often support abundant populations of small mammals such as western harvest mouse (*Reithrodontomys megalotis*) and California vole (*Microtus californicus*), which is a major prey species for Swainson's Hawk. These species in turn attract predators such as gopher snake (*Pituophis catenifer catenifer*), western racer (*Coluber constrictor*), American Kestrel (*Falco sparverius*), and Red-Tailed Hawk (*Buteo jamaicensis*). Other reptile and bird species prey on the insect populations abundant in row crop and silage fields, including western fence lizard (*Sceloporus occidentalis*), Tricolored Blackbird, Brewer's Blackbird (*Euphagus cyanocephalus*), American Crow (*Corvus brachyrhynchos*), and the invasive non-native European Starling (*Sturnus vulgaris*). Although row crop and silage fields do support habitat for some common and special-status wildlife species, they do so for only a short duration, with such habitat eliminated after harvest. Tilling practices during and after harvest undoubtedly cause mortality of terrestrial wildlife species, including small mammals such as western harvest mouse and California vole.

Rice (*Oryza* sp.) is a flood-irrigated crop of seed-producing annual grasses. It is maintained in a flooded state until it is nearly mature. Rice is usually grown in areas that previously supported natural wetlands, and many wetland wildlife species, especially waterfowl and shorebirds, use rice fields. Waste grain also provides food for Sandhill Crane. Other wildlife that forage or use rice fields include giant garter snakes (*Thamnophis gigas*), bullfrogs, and wading birds that forage on aquatic invertebrates and small vertebrates (such as crayfish and small fishes). Rice fields provide habitat for a range of wintering waterfowl species in the Yolo Bypass. The

practice of flooding rice fields in winter to allow rice stubble to rot, instead of burning rice stubble in the fall, gives a wide variety of ducks and geese the opportunity to forage in rice fields in winter and provides important foraging habitat for shorebirds. Fallow rice fields also provide important habitat for geese, cranes, large herons, and egrets and can provide breeding habitat for waterfowl such as Mallard (*Anas platyrhynchos*) and Gadwall (*Anas strepera*) (DWR 2013).

Agricultural areas provide habitat for a variety of wildlife species, including bats, amphibians, reptiles, and birds. Flooded rice fields in the study area provide breeding habitat for giant garter snakes and valley garter snakes. Agricultural areas can also provide foraging habitat for Federally and/or State-listed species, including Swainson's Hawk and Greater Sandhill Crane (*Grus canadensis tabida*).

9.1.1.2 Annual and Perennial Grassland

The annual and perennial grassland community occupies a spectrum ranging from natural to intensively managed vegetation dominated by grasses. At the more natural end of the spectrum, this community consists of native or introduced annual and perennial grasses and forbs (Hickson and Keeler-Wolf 2007). At the intensively managed end of the spectrum, it includes non-irrigated pasturelands (CALFED Bay-Delta Program [CALFED] 2001). Grasslands are often found adjacent to wetland riparian habitats and are the dominant community on managed levees.

There are two types of annual and perennial grasslands in the study area: California annual herb/grassland (which includes native herbaceous plants although non-native grasses might still be dominant) and California naturalized annual and perennial grassland (which is dominated by non-native grass species with very little or no presence of native herbaceous plants). These grasslands are present throughout the FWWA. Grasslands in the study area contain herbaceous vegetation dominated in some large areas by native grasses, including wild-rye (*Elymus* spp.) and whiteroot (*Carex barbarae*), and in other areas by highly adaptive and invasive plant species, including non-native fobs and, to a lesser extent, non-native annual grasses, with few, if any, native plant species present.

The grassland community designation has also been applied to areas that have been cleared of their natural vegetation cover such as levee faces and edges of agricultural fields and roads. Vegetation in these areas is best characterized as ruderal, meaning it is dominated by herbaceous, non-native plant species, some of which are considered invasive by the California Invasive Plant Council (Cal-IPC). Representative species that are present in ruderal grassland areas are common mallow (*Malva* sp.), bull thistle (*Cirsium vulgare*), bindweed (*Convolvulus arvensis*), poison hemlock (*Conium maculatum*), wild lettuce (*Lactuca* spp.), Russian thistle (*Salsola tragus*), and non-native annual grasses, including wild oats (*Avena* spp.), bromes (*Bromus* spp.), and barleys.

Representative plant species observed within the grassland community during 2014 field surveys include rye grass (*Festuca perennis*), mustard (*Brassica* spp.), bromes, yellow star-thistle (*Centaurea solstitialis*), annual rabbit's-foot grass (*Polypogon monspeliensis*), chicory (*Cichorium intybus*), cocklebur (*Xanthium* sp.), common groundsel (*Senecio vulgaris*), curly dock (*Rumex crispus*), evening primrose (*Oenothera* sp.), hyssop loosestrife (*Lythrum hyssopifolia*), ludwigia (*Ludwigia* sp.), milk thistle (*Silybum marianum*), Douglas' mugwort (*Artemisia douglasiana*), plantain (*Plantago* sp.), prickly lettuce (*Lactuca serriola*), woolly rose-mallow (*Hibiscus lasiocarpus* var. *occidentalis*), salt grass (*Distichlis spicata*), verbena (*Verbena* sp.), and white sweet clover (*Melilotus albus*).

Grassland communities provide foraging, breeding, and cover habitat for a variety of wildlife species, including gopher snake, western racer, Tricolored Blackbird, Swainson's Hawk, Western Meadowlark, Red-tailed Hawk, giant garter snake, western harvest mouse, California vole, American badger (*Taxidea taxus*), and numerous bat species.

9.1.1.3 Open Water and Freshwater Aquatic Vegetation

Perennial aquatic communities range in size from small ponds to open waters and areas with freshwater aquatic vegetation. These communities can be found in association with any terrestrial habitat and can transition into freshwater emergent marsh and valley oak riparian woodland (DWR 2013).

9.1.1.3.1 Open Water

Perennial waters in the study area include the Sacramento River (a navigable water of the United States), a portion of an old river oxbow, and Tule Pond. Other open water in the study area includes small semi-permanent ponds and depressions. The Sacramento River intersects the northern edge of the study area at the boundary of the FWWA. A portion of an old river oxbow intersects the west side of the study area in the FWWA while small semi-permanent depressions are present along the eastern edge of the study area, and areas of ponding water also occur interspersed with woody riparian vegetation within the emergent tule marsh community. The depressional waters along the eastern edge were dry during field surveys conducted in August and October 2014; however, this occurred after several years of drought. Fish and beaver carcasses were observed in the dried-out pools. Water levels in these areas are dependent on overtopping events, hyporheic flow from the Sacramento River, and possible seepage from the cross drain.

Open water provides foraging and winter roosting habitat for wildlife that depend on other habitats for breeding and cover. Wildlife species typical of these communities include Pied-Billed Grebe (*Podilymbus podiceps*), Western Grebe (*Aechmophorus occidentalis*), Ruddy Duck (*Oxyura jamaicensis*), Mallard, Canada Goose (*Branta canadensis*), Bufflehead (*Bucephala albeola*), western pond turtle (*Actinemys marmorata*), and river otter (*Lontra canadensis*). Aquatic communities also provide suitable foraging habitat for numerous species of bats.

Open water is considered waters of the U.S. and activities involving dredging, excavation, filling, or other modifications are regulated by the United States Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA) and under Section 10 of the Rivers and Harbors Act (applies to navigable waters). Open water is also considered waters of the State subject to regulation by the Regional Water Quality Control Board (RWQCB) under Section 401 of the CWA and under the Porter-Cologne Water Quality Control Act (Porter-Cologne Act). When this community is associated with a river, lake, or stream, activities that substantially alter, divert, or obstruct flow or that deposit materials that may enter a river, lake, or stream may also be regulated by CDFW under Section 1602 of the California Fish and Game Code through a Lake and Streambed Alteration Agreement.

9.1.1.3.2 Freshwater Aquatic Vegetation

The open portions of aquatic communities typically lack vegetation; however, the borders of these features contain freshwater emergent vegetation. Parts of the study area are covered by floating mats of vegetation dominated by mosquito fern (*Azolla* spp.) and water primrose (*Ludwigia* spp.) wetlands. These areas are dominated by plant species considered highly invasive by Cal-IPC, meaning they can have severe ecological impacts to plant and animal communities and moderate-to-high rates of dispersal and establishment, and are widely distributed ecologically (Cal-IPC 2017). They can outcompete native plants, clog natural waterways, and provide habitat for mosquitos (Sawyer et al. 2009). These vegetated areas are found along Tule Pond, the seasonal wetland adjacent to Tule Pond, Tule Canal, and along the old river oxbow.

Submerged aquatic plants have leaves and stems that are fully submerged for all or nearly all their life cycle, and they often have root systems reduced to minimal anchorage structures in pond or river beds. Many native submerged aquatic species, including pondweeds, such as sago pondweed (*Stuckenia pectinata*) and stoneworts (*Chara* spp., green algae structurally similar to vascular plants), are highly valuable food plants for waterfowl and provide nursery habitat for aquatic invertebrates and fish. Submerged aquatic vegetation can form patches or beds of extensive bottom "canopy" habitat.

Freshwater aquatic vegetation communities are considered Waters of the U.S. and activities involving dredging, excavation, filling, or other modifications are regulated by the USACE under Section 404 of the CWA and under Section 10 of the Rivers and Harbors Act (applies to navigable waters). These communities are also considered waters of the State subject to regulation by the RWQCB under Section 401 of the CWA and under the Porter-Cologne Water Quality Control Act. When this community is associated with a river, lake, or stream, activities that substantially alter, divert, or obstruct flow or that deposit materials that may enter a river, lake, or stream may also be regulated by CDFW under Section 1602 of the California Fish and Game Code through a Lake and Streambed Alteration Agreement.

9.1.1.4 Freshwater Emergent Marshes and Seeps

Freshwater emergent marshes and seeps include seasonally and permanently saturated wetlands dominated by emergent plant species, some of which can tolerate permanent saline or brackish conditions, including hardstem bulrush (*Schoenoplectus californicus*), which dominates the edges of Tule Pond and the seasonal wetland adjacent to Tule Pond. Some of these seasonal wetlands dry up in late summer naturally (such as areas adjacent to Tule Pond) or are managed to do so (such as many of the duck clubs at the southern end of the floodway, south of I-80). These communities occur along the edges of Tule Pond, throughout riparian woodland, and in the seasonal marsh adjacent to Tule Pond. Shallow emergent wetlands (water less than 3 feet deep) are dominated by thick, tall, highly productive stands of tules (*Schoenoplectus* spp.) and cattails (*Typha* spp.) (DWR 2013). The freshwater emergent marsh communities in the study area are stable areas characterized by very little hydrologic or physical disturbance. Mapped freshwater emergent marsh and seep communities in the study area include California and hardstem bulrush marsh, Douglas' mugwort patches, and managed annual wetland vegetation. These communities are described below.

9.1.1.4.1 California and Hardstem Bulrush Marsh

California and hardstem bulrush marsh is a freshwater marsh community dominated by California bulrush (*Schoenoplectus californicus*) and hardstem bulrush (*Schoenoplectus acutus*). These marshes occur along the eastern part of the FWWA. Broad, deeply flooded areas that are covered by open water most of the year and that develop emergent mud beds late in the growing season effectively alternate between seasonal ponds and freshwater marshes. Common physical disturbances to this community throughout its range are either direct, such as channel dredging (which can impact giant garter snake and Tricolored Blackbird), or indirect, resulting from adjacent agricultural, commercial, or residential activities. Disturbed freshwater emergent marshes that occur in ditches support a higher proportion of cattails than do undisturbed freshwater emergent marshes. Characteristic forbs and grass-like species associated with these communities include a mix of native and non-native species such as cocklebur, curly dock, knotweed (*Polygonum* spp.), common spikerush (*Eleocharis palustris*), annual rabbit's-foot grass, and dallis grass (*Paspalum dilatatum*). In addition, large stands of sedge (*Carex* sp.) are dominant in parts of the study area and included in the areas mapped as California and hardstem bulrush marsh. The higher-elevation edges of freshwater marsh gradients might be characterized by abrupt transitions to terrestrial vegetation, or they might transition into vegetated seasonal wetlands or riparian woodland (DWR 2013).

Freshwater emergent marshes provide important foraging, breeding, and winter roosting habitat for a variety of wildlife species; dense emergent vegetation provides concealment from predators. Reptiles and amphibians associated with this community include giant garter snake, Pacific chorus frog (*Pseudacris regilla*), and bullfrog (*Lithobates catesbeianus*). Within the study area, this habitat is used by locally common to abundant wading birds, such as egrets and herons (subfamily Ardeinae); waterfowl, such as ducks, geese, and swans (*Cygnus* spp.); shorebirds, such as rails, plovers, and sandpipers; and perching birds such as Red-Winged Blackbird (*Agelaius phoeniceus*), Tricolored Blackbird, Marsh Wren (*Cistothorus palustris*), and Common Yellowthroat (*Geothlypis trichas*).

Freshwater emergent marshes, including California hardstem and bulrush marsh are considered wetland Waters of the U.S., and activities involving dredging, excavation, filling, or other modifications are regulated by the USACE under Section 404 of the CWA. These marshes are also considered waters of the State subject to regulation by the RWQCB under Section 401 of the CWA and under the Porter-Cologne Act. When this community is associated with a river, lake, or stream, activities that substantially alter, divert, or obstruct flow or that deposit materials that may enter a river, lake, or stream may also be regulated by CDFW under Section 1602 of the California Fish and Game Code through a Lake and Streambed Alteration Agreement.

9.1.1.4.2 Douglas' Mugwort Patches

Douglas' mugwort patches are characterized by the predominance of Douglas' mugwort (*Artemisia douglasiana*) in the herbaceous layer and the absence of an overstory tree canopy layer. These patches occur adjacent to riparian forest and riparian woodland in the western part of the FWWA, south of the old river oxbow. Douglas' mugwort also occurs in the understory of these riparian forest and woodland communities.

9.1.1.4.3 Managed Annual Wetland Vegetation

Managed wetlands consist of areas that are intentionally flooded and managed during specific seasonal periods to enhance habitat values for specific wildlife species. Many managed wetlands are created through the Natural Resources Conservation Service Wetlands Reserve Program and United States Fish and Wildlife Service (USFWS) grants to provide habitat for overwintering migratory waterfowl. The typical hydrologic management regime includes flooding during the winter arrival of migratory birds, followed by a slow drawdown to manage plant seed production and control mosquito populations. Summer irrigation may also be conducted to grow forage for overwintering waterfowl and provide habitat for summer migrants. In the study area, managed wetlands are found at Agricultural Road Crossing 1, the proposed north and south water control structures, and primarily south of the FWWA throughout most of the Yolo Bypass, near the proposed channels for Alternative 5 south of I-80. Although Appendix H1 shows managed wetlands as occurring in the FWWA near the old river oxbow and at the southeastern extent of the FWWA, these areas are not actively managed for waterfowl or other wildlife.

The managed wetland community is characterized by the presence of robust, perennial emergent vegetation and annual-dominated, moist-soil grasses and forbs in freshwater areas. Vegetation that is important to waterfowl includes smartweed (*Polygonum* spp.), bulrush (*Bolboschoenus, Schoenoplectus*, or *Scirpus* spp.), brass buttons (*Cotula* spp.), knotweed, barnyard grass (*Echinochloa crus-galli*), and burhead (*Echinodorus berteroi*.). During periods when water is drained from the habitat, a variety of annual grasses and forbs germinate and grow beneath and in the space around clumping emergent plants such as cattails and hardstem bulrush (DWR 2013).

Wetlands that are managed are often done so specifically to provide habitat for wintering waterfowl species such as Northern Pintail (*Anas acuta*), Mallard, American Wigeon (*Anas americana*), Green-Winged Teal (*Anas carolinensis*), Northern Shoveler (*Anas clypeata*), Gadwall, Cinnamon Teal (*Anas cyanoptera*), Ruddy Duck, Canvasback (*Aythya collaris*), White-Fronted Goose (*Anser albifrons*), and Canada Goose. Some wetlands are also managed for breeding waterfowl, especially mallards. In the southern portion of the study area, wetlands are managed to provide habitat for the high diversity of shorebirds that rely on these wetlands during winter and long-distance migrations. Species regularly observed during these periods include Western Sandpiper (*Calidris mauri*), Least Sandpiper (*Calidris minutilla*), Long-Billed Dowitcher (*Limnodromus scolopaceus*), Short-Billed Dowitcher (*Limnodromus griseus*), Dunlin (*Calidris alpina*), Greater Yellowlegs (*Tringa melanoleuca*), Lesser Yellowlegs (*Tringa flavipes*), Whimbrel (*Numenius phaeopus*), Long-Billed Curlew (*Numenius americanus*), and Wilson's Phalarope (*Phalaropus tricolor*) (DWR 2013).

Many managed wetlands qualify as wetland Waters of the U.S. and activities involving dredging, excavation, filling, or other modifications are regulated by the USACE under Section 404 of the CWA. These communities are also considered waters of the State subject to regulation by the RWQCB under Section 401 of the CWA and under the Porter-Cologne Water Quality Control Act. This community is also of special interest to the resource agencies, such as CDFW, that are responsible for managing waterfowl and shorebird populations in California.

9.1.1.5 Riparian Forest/Woodland

The study area supports winter-deciduous, broadleaved trees up to 60 feet in height in the riparian forest/woodland community where the canopy cover ranges from relatively open to very dense. At present, riparian forest/woodland communities dominated by tree species occur in the interior portion of the FWWA and along channels, rivers, the old river oxbow, and interspersed with California and hardstem bulrush marsh in the study area (DWR 2013).

Riparian forest/woodland communities in the study area include black willow thickets, box elder forest, Fremont cottonwood forest, mixed hardwood forest, and valley oak woodland. Tree species observed in these communities include hardwood species such as Fremont cottonwood (*Populus fremontii*), Oregon ash (*Fraxinus latifolia*), valley oak (*Quercus lobata*), black willow (*Salix gooddingii*), California sycamore (*Platanus racenisa*), walnut (*Juglans* spp.), and box elder (*Acer negundo*). The community name is determined by the dominant plant species within the tree layer (e.g., black willow thickets are dominated by black willows, whereas mixed hardwood forests are characterized by a codominance of two or more trees such as Fremont cottonwood and black willow). These communities often have a shrubby understory consisting of buttonbush (*Cephalanthus occidentalis*), California grape (*Vitis californica*), California rose (*Rosa californica*), coyote brush (*Baccharis piluaris*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), sandbar willow (*Salix exigua*), poison oak (*Toxicodendron diversilobum*), red willow (*Salix laevigata*), tree of heaven (*Ailanthus altissima*), and Himalayan blackberry (*Rubus armeniacus*). In addition, annual species, such as ryegrass, mustard, bromes, and yellow star thistle, are intermixed in the understory layer.

Riparian forest/woodland communities support a wide variety of wildlife species. Deer thrive in this environment and are a heavily targeted game species. Riparian trees are used for nesting, roosting, foraging, and protective cover by many bird species, including Swainson's Hawk, Yellow-billed Cuckoo, Least Bell's Vireo, Tricolored Blackbird, Wild Turkey (*Meleagris gallopavo*), Black-Headed Grosbeak (*Pheucticus melanocephalus*), Tree Swallow (*Tachycineta bicolor*), Bewick's Wren (*Thryomanes bewickii*), and Cooper's Hawk (*Accipiter cooperii*). Riparian communities provide foraging habitat for common mammals such as western gray squirrel (*Sciurus griseus*) and day and night roosting and foraging habitat for bats. Understory shrubs provide cover for mammals, such as cottontail, and ground-nesting birds, such as Spotted Towhee (*Pipilo maculatus*), that forage among the vegetation and leaf litter. Mammals, such as bats, raccoons, and opossums, benefit from the variety of berries, invertebrates, small mammals, and bird eggs that provide food. Drier, open areas of forest and woodland can provide suitable foraging and denning habitat for American badger.

Riparian forest/woodland communities are subject to CDFW regulations under California Fish and Game Code Section 1602 and Fish and Game Code Section 3503 when nesting birds are present. These woodlands are also considered sensitive natural communities by CDFW because they have sustained considerable losses throughout the State.

9.1.1.6 Riparian Scrub

Riparian scrub communities in the study area include non-native Himalayan blackberry brambles and native sandbar willow thickets. These communities occur near the old river oxbow, along Tule Canal, and along the Sacramento River. Himalayan blackberry is considered an invasive plant with a high rating by Cal-IPC (Cal-IPC 2017).

Riparian scrub supports a variety of wildlife species, many of which are common to riparian forest/woodland. Wildlife species that are commonly associated with riparian scrub are Least Bell's Vireo, Tricolored Blackbird, Black-crowned Night Heron (*Nycticorax nycticorax*), California Quail (*Callipepla californica*), and Yellow-Breasted Chat (*Icteria virens*).

Riparian scrub communities are subject to CDFW regulations under California Fish and Game Code Section 1602 and Fish and Game Code Section 3503 when nesting bird species are present.

9.1.2 Special-Status Species

Special-status species are defined as species that are legally protected or that are otherwise considered sensitive by Federal, State, or local resource agencies. Special-status species are species, subspecies, or varieties that fall into one or more of the following categories, regardless of their legal or protection status:

- Officially listed by the USFWS or CDFW as endangered, threatened, or rare
- A candidate for Federal or State listing as endangered, threatened, or rare
- Taxa (i.e., taxonomic categories or groups) that meet the criteria for listing even if they are not currently included on any list, as described in California Code of Regulations (CCR) Section 15380 of the State CEQA Guidelines
- Species identified by CDFW as Species of Special Concern (SSC)
- Species protected under the Migratory Bird Treaty Act of 1918 (MBTA)
- Species afforded protection under local planning documents
- Taxa considered by CDFW to be "rare, threatened, or endangered in California" and assigned a California Rare Plant Rank (CRPR) by the California Native Plant Society (CNPS). This system includes six rarity and endangerment ranks for categorizing plant species of concern, which are summarized as follows:
  - CRPR 1A: Plants presumed extirpated in California and either rare or extinct elsewhere
  - CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere
  - CRPR 2A: Plants presumed extirpated in California but more common elsewhere
  - CRPR 2B: Plants that are rare, threatened, or endangered in California but more common elsewhere
  - CRPR 3: Plants about which more information is needed—a review list
  - CRPR 4: Plants of limited distribution—a watch list[1]

CDFW considers all plants with a CRPR to be "special plants." The term "special plants" is a broad term used by CDFW to refer to all the plant taxa inventoried in CDFW's California

[1] CDFW recommends that CRPR 1A, 1B, 2B, and 3 species be addressed in CEQA projects. In general, CRPR 4 species do not meet the definition of endangered, rare, or threatened pursuant to CEQA Section 15380; however, these species may be evaluated on a case-by-case basis to determine significance criteria under CEQA if they are considered locally important.

Natural Diversity Database (CNDDB), regardless of their legal or protection status (CDFW 2016).

The term "California Species of Special Concern" is applied by CDFW to animals that are not listed under CESA but that are declining at a rate that could result in listing, or that historically occurred in low numbers and there are currently known threats to their persistence. CDFW's fully protected status was California's first attempt to identify and protect animals that were rare or facing extinction. Most species listed as fully protected were eventually listed as threatened or endangered under CESA; however, some species remain listed as fully protected but do not have simultaneous listing under CESA. Fully protected species may not be taken or possessed at any time, and no take permits can be issued for these species except for scientific research purposes or for relocation to protect livestock.

The Lead Agencies for this EIS/EIR developed a list of special-status species that are known to occur or that could occur in the study area or immediate vicinity through a review of previously prepared environmental documents, the USFWS's Information for Planning and Conservation system, CDFW's CNDDB Rarefind 5 online application, and CNPS's Online Inventory of Rare and Endangered Vascular Plants of California (Appendices H2 and H3; CNPS 2016; USFWS 2016b). The team compiled a comprehensive list of regionally occurring special-status species and sensitive natural communities for the following 7.5-minute United States Geological Survey (USGS) topographic quadrangles that cover the Project area and the surrounding Project vicinity:

- Sacramento West
- Clarksburg
- Davis
- Grays Bend
- Knights Landing
- Liberty Island
- Rio Vista
- Saxon
- Taylor Monument

9.1.2.1 Field Surveys

In 2014, DWR and HDR field-verified the vegetation classifications using the *Fine-Scale Riparian Vegetation Mapping of the Central Valley Flood Protection Plan Area Final Report* (CDFW 2013) and mapped the locations of elderberry shrubs, which provide suitable habitat for valley elderberry longhorn beetles. Exit holes on elderberry shrubs were not assessed during these surveys.

DWR conducted habitat assessments for special-status plant species in 2014 and 2015 (DWR 2014a, 2015a). Botanical surveys were conducted in accordance with rare plant survey protocols from CNPS (2001) and CDFW (2009).

Habitat assessments for giant garter snake, western pond turtle, and special-status bat species were conducted in 2014 and 2015 (DWR 2014b, 2014c, 2015b, and 2015c). Habitat assessments for special-status bird species were conducted in 2015, with all bird species, including nesting observations, recorded (DWR 2015e).

All field surveys focused on areas of potential ground disturbance, including along Fremont Weir, Tule Canal, and Agricultural Road Crossing 1. Areas of private property were not surveyed because access was restricted. Detailed information for each of these surveys, including specific survey dates and the results of the field surveys, is provided below.

9.1.2.2 Special-Status Plants

The Lead Agencies identified 35 special-status plant species during database queries (Appendix H2). Of these species, two are known to occur in the construction study area (Northern California black walnut and woolly rose-mallow), and 11 have the potential to occur in the construction study area because of the presence of suitable soils and habitat (e.g., freshwater marsh and alkaline grassland). These species, their sensitivity statuses, and their potential for occurrence in the construction and operations study areas are shown in Table 9-3. Additional information on these species' habitat requirements and special-status plant species that were determined to not have any potential to occur in the construction and/or operations study areas are included in Appendix H4.

Table 9-3. Special-Status Plant Species with the Potential to Occur in the Construction Study Area or in the Operations Study Area

Common Name Scientific Name	Status (Federal/State/CRPR)	Potential for Occurrence	Study Area
California alkali grass *Puccinellia simplex*	-/-/1B.2	Suitable habitat in the FWWA	Construction
Baker's navarretia *Navarretia leucocephala* ssp. *bakeri*	-/-/1B.1	Known from Tule Ranch in the YBWA	Operations
Bearded popcornflower *Plagiobothrys hystriculus*	–/–/1B.1	Known from Tule Ranch in the YBWA	Operations
Boggs Lake hedge-hyssop *Gratiola heterosepala*	-/SE/1B.2	Suitable habitat at Tule Ranch in the YBWA	Operations
Bristly sedge *Carex comosa*	-/-/2B.1	Suitable habitat in the FWWA	Construction
California alkali grass *Puccinellia simplex*	-/-/1B.2	Suitable habitat at Tule Ranch in the YBWA	Operations
Colusa grass *Neostapfia colusana*	FT/SE/1B.1	Suitable habitat occurs at Tule Ranch in the YBWA	Operations
Delta tule pea *Lathyrus jepsonii* var. *jepsonii*	-/-/1B.2	Suitable habitat in the FWWA Known from the Yolo Bypass, south of I-80	Construction + Operations

Common Name Scientific Name	Status (Federal/State/CRPR)	Potential for Occurrence	Study Area
Dwarf downingia *Downingia pusilla*	-/-/2B.2	Suitable habitat at Tule Ranch in the YBWA	Operations
Ferris' milkvetch *Astragalus tener* var. *ferrisiae*	-/-/1B.1	Known from Tule Ranch in the YBWA	Operations
Heartscale *Atriplex cordulata* var. *cordulata*	-/-/1B.2	Suitable habitat in the FWWA	Construction
Heckard's pepper grass *Lepidium latipes*	-/-/1B.2	Suitable habitat in the FWWA Known from Tule Ranch in the YBWA	Construction + Operations
Hogwallow starfish *Hesperevax caulescens*	–/–/4.2	Known from Tule Ranch in the YBWA	Operations
Jepson's coyote-thistle *Eryngium jepsonii*	--/--/1B.2	Known from Tule Ranch in the YBWA	Operations
Legenere *Legenere limosa*	-/-/1B.1	Known from Tule Ranch in the YBWA	Operations
Little mousetail *Myosurus minimus*	–/–/3.1	Known from Tule Ranch in the YBWA	Operations
Northern California black walnut *Juglans hindsii*	-/-/1B.1	Calflora FWWA record from 2014	Construction
Parry's rough tarplant *Centromadia parryi* ssp. *rudis*	-/-/4.2	Suitable habitat occurs at Tule Ranch in the YBWA	Operations
Peruvian dodder *Cuscuta obtusiflora* var. *glandulosa*	-/-/2B.2	Suitable habitat in the FWWA	Construction
Saline clover *Trifolium hydrophilum*	-/-/1B.2	Suitable habitat in the FWWA	Construction
San Joaquin spearscale *Extriplex joaquinana*	-/-/1B.2	Known from the Yolo Bypass south of I-80	Construction + Operations
Sanford's arrowhead *Sagittaria sanfordii*	-/-/1B.2	Suitable habitat in the FWWA	Construction
Solano grass [also called Crampton's tuctoria] *Tuctoria mucronata*	FE/SE/1B.1	Suitable habitat occurs at Tule Ranch in the YBWA	Operations
Suisun Marsh aster *Symphyotrichum lentum*	-/-/1B.2	Suitable habitat in the FWWA Known from the Yolo Bypass south of I-80	Construction + Operations
Vernal pool smallscale Atriplex persistens	-/-/1B.2	Suitable habitat at Tule Ranch in the YBWA	Operations

Common Name Scientific Name	Status (Federal/State/CRPR)	Potential for Occurrence	Study Area
Woolly rose-mallow *Hibiscus lasiocarpus* var. *occidentalis*	-/-/1B.2	Observed in the FWWA and at Agricultural Road Crossing 1 during 2014 and 2015 surveys	Construction
Wright's trichocoronis Trichocoronis wrightii var. wrightii	-/-/2B.1	Suitable habitat occurs at Tule Ranch in the YBWA	Operations

Key: CRPR = California Rare Plant Rank; FE = Federally endangered; FT = Federally threatened; FC = Federal candidate for listing; FWWA = Fremont Weir Wildlife Area; SE = State endangered; ST = State threatened; SR = State rare; YBWA = Yolo Bypass Wildlife Area

CNPS Rare Plant Ranks (California Rare Plant Ranks are assigned by a committee of government agency and non-governmental botanical experts and are not official state designations of rarity status): 1A = presumed extinct in California; 1B = rare, threatened, or endangered in California and elsewhere; and 2B = rare, threatened, or endangered in California but more common elsewhere. Threat Ranks: 0.1 = seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat); 0.2 = moderately threatened in California (20 to 80 percent occurrences threatened/moderate degree and immediacy of threat); and 0.3 = not very threatened in California (less than 20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known).

Field surveys for special-status plants with the potential to occur in the study area were conducted by DWR along Fremont Weir, from the old river oxbow along the western extent of the FWWA, across the northern part of the FWWA, along the eastern extent of the FWWA and Tule Canal, and downstream at Agricultural Road Crossing 1. These surveys that focused on areas of potentially suitable habitat were conducted by DWR on 536 acres on August 27, 2014; between March 2 and March 26, 2015; and between July 8 and July 30, 2015 (DWR 2014a, 2015a). These focused special-status plant species surveys were conducted following several years of drought; therefore, these surveys might not have captured some of the annual species with the potential to occur in the study area. Only one of these species, woolly rose-mallow, was observed during the surveys.

Not included in the 2014 and 2015 survey areas were alkaline grasslands in the central portion of the FWWA in the study area for Alternatives 2 through 6 that provide potentially suitable habitat for heartscale, San Joaquin spearscale, Heckard's pepper grass, California alkali grass, and saline clover.

Figure 9-1 provides the locations of the special-status species that were observed during field surveys in relation to the combined project footprint of all alternatives.

Figure 9-1. Special-Status Plant and Wildlife Species Observations

9.1.2.3 Special-Status Wildlife

A total of 61 special-status wildlife species were identified during database queries (Appendix H2). Of these species, 13 are known from the construction study area or the immediate vicinity, and 30 have the potential to occur in the construction study area due to the presence of suitable habitat, but were not observed during surveys. These species, their sensitivity statuses, and their potential for occurrence in the construction and operations study areas are shown in Table 9-4. Additional information on these species' habitat requirements and special-status wildlife species that were determined to not have the potential to occur in the construction and/or operations study areas are included in Appendix H4.

Table 9-4. Special-Status Wildlife Species with the Potential to Occur in the Construction Study Area or the Operations Study Area

Common Name Scientific Name	Status (Federal/State/Other)	Potential for Occurrence	Study Area
Invertebrates			
Conservancy fairy shrimp *Branchinecta conservatio*	FE/--/--	Known from Tule Ranch in the YBWA	Operations
Vernal pool fairy shrimp *Branchinecta lynchi*	FT/--/--	Known from Tule Ranch in the YBWA	Operations
Midvalley fairy shrimp *Branchinecta mesovallensis*	--/--/--	Known from Tule Ranch in the YBWA	Operations
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT/--/--	Suitable habitat (elderberry host plant) in the FWWA Known from the Yolo Bypass	Construction + Operations
Vernal pool tadpole shrimp Lepidurus packardi	FE/--/--	Suitable habitat at Tule Ranch in the YBWA	Operations
Amphibians			
California tiger salamander Ambystoma californiense	FT/ST/SSC	Suitable habitat at Tule Ranch in the YBWA	Operations
Western spadefoot toad Spea hammondii	--/--/SSC	Suitable habitat at Tule Ranch in the YBWA	Operations
Reptiles			
Western pond turtle Emys marmorata	--/--/SSC	Suitable habitat in the construction study area Known from Wallace Weir in the Yolo Bypass	Construction + Operations
Giant garter snake Thamnophis gigas	FT/ST/--	Suitable habitat in the construction study area Known from the Yolo Bypass	Construction + Operations

Common Name Scientific Name	Status (Federal/State/Other)	Potential for Occurrence	Study Area
Birds			
Sharp-shinned Hawk*Accipiter striatus*	--/--/SSC	Foraging habitat along Putah Creek and Sacramento River levee toe drains	Operations
Cooper's Hawk Accipiter cooperii	--/--/SSC	Known from the FWWA and throughout the Yolo Bypass	Construction + Operations
Tricolored Blackbird Agelaius tricolor	UR/--/SSC	Suitable nesting and foraging habitat in the construction study area; observed at the FWWA Known from the Yolo Bypass	Construction + Operations
Grasshopper Sparrow (nesting) Ammodramus savannarum	--/--/SSC	Suitable nesting habitat in the construction study area Known breeder in the YBWA	Construction + Operations
Greater Sandhill Crane Antigone canadensis tabida	--/ST/FP	Suitable winter foraging habitat in the construction study area Winter visitor to the Central Valley; the YBWA is managed to provide habitat for this species	Construction + Operations
Golden Eagle Aquila chrysaetos	--/--/FP	Suitable foraging habitat in the construction study area Known to forage throughout the Yolo Bypass in winter	Construction + Operations
Great Egret Ardea alba	--/--/--	Suitable foraging habitat in the construction study area; breeding colonies documented adjacent to the FWWA Known from the Yolo Bypass south of I-80	Construction + Operations
Great Blue Heron Ardea herodias	--/--/--	Suitable nesting and foraging habitat in the construction study area; breeding colonies documented adjacent to the FWWA Known breeder and forager in the Yolo Bypass	Construction + Operations
Short-eared Owl Asio flammeus	--/--/SSC	Suitable nesting and foraging habitat in the construction study area Winter visitor to and rare nesting species in the Yolo Bypass	Construction + Operations
Burrowing Owl Athene cunicularia	--/--/SSC	Suitable habitat present in the construction study area Known from the Yolo Bypass south of I-80	Construction + Operations

Common Name Scientific Name	Status (Federal/State/Other)	Potential for Occurrence	Study Area
Redhead Aythya americana	--/--/SSC	Suitable nesting and foraging habitat in the construction study area Known from the Yolo Bypass	Construction + Operations
Ferruginous Hawk Buteo regalis	--/--/SSC	Suitable winter foraging habitat in the construction study area Winter visitor to the Central Valley	Construction + Operations
Swainson's Hawk Buteo swainsoni	--/ST/--	Suitable nesting habitat in the construction study area; known from the FWWA Known from the Yolo Bypass	Construction + Operations
Mountain Plover Charadrius montanus	--/--/SSC	Suitable wintering habitat in the construction study area Suitable wintering habitat in the Yolo Bypass	Construction + Operations
Black Tern Chlidonias niger	--/--/SSC	Suitable habitat in the construction study area during spring migration Known from the Yolo Bypass primarily during migration	Construction + Operations
Northern Harrier Circus cyaneus	--/--/SSC	Suitable nesting and foraging habitat in the construction study area; observed at Agricultural Road Crossing 1 Known from the Yolo Bypass	Construction + Operations
Western Yellow-billed Cuckoo Coccyzus americanus occidentalis	FC/SE/--	Suitable nesting and foraging habitat in the construction study area; known from the FWWA during migration Known from the Yolo Bypass	Construction + Operations
California Yellow Warbler Dendroica petechia brewsteri	--/--/SSC	Suitable habitat in the construction study area Known from the Yolo Bypass only during migration	Construction + Operations
Snowy Egret Egretta thula	--/--/--	Suitable nesting and foraging habitat in the construction study area; observed at the FWWA and Agricultural Road Crossing 1 Suitable habitat in the Yolo Bypass	Construction + Operations

Common Name Scientific Name	Status (Federal/State/Other)	Potential for Occurrence	Study Area
White-tailed Kite Elanus leucurus	--/--/FP	Suitable nesting and foraging habitat in the construction study area; observed at the FWWA Known from the Yolo Bypass	Construction + Operations
Little Willow Flycatcher Empidonax traillii brewsteri	--/SE/--	Suitable foraging habitat in the construction study area Migrates through the Yolo Bypass during spring and fall	Construction + Operations
California Horned Lark Eremophila alpestris actia	--/--/SSC	Suitable foraging habitat in the construction study area Known to be a year-round resident in the Yolo Bypass	Construction + Operations
Merlin Falco columbarius	--/--/SSC	Suitable winter foraging habitat in the construction study area Winter visitor to the Yolo Bypass	Construction + Operations
Prairie Falcon Falco mexicanus	--/--/SSC	Suitable winter foraging habitat in the construction study area Non-breeding winter visitor to the Yolo Bypass	Construction + Operations
American Peregrine Falcon Falco peregrinus anatum	--/SE/FP	Suitable foraging habitat in the construction study area Nonbreeding visitor to the Yolo Bypass	Construction + Operations
Bald Eagle Haliaeetus leucocephalus	FD/SE/BCC, FP	Suitable winter foraging habitat in the construction study area Winter visitor to the Yolo Bypass	Construction + Operations
Yellow-breasted Chat Icteria virens	--/--/SSC	Suitable nesting habitat in the construction study area Known from the Yolo Bypass	Construction + Operations
Least Bittern Ixobrychus exilis	--/--/SSC	Suitable nesting and foraging habitat in the construction study area Known breeder in the YBWA	Construction + Operations
Loggerhead Shrike Lanius ludovicianus	--/--/SSC	Suitable nesting and foraging habitat in the construction study area; known from the FWWA Known to nest and forage at Tule Ranch in the YBWA	Construction + Operations

Common Name Scientific Name	Status (Federal/State/Other)	Potential for Occurrence	Study Area
California Gull Larus californicus	--/--/SSC	Suitable foraging habitat in the construction study area Known to forage year-round in the Yolo Bypass, especially during winter floods	Construction + Operations
California Black Rail Laterallus jamaicensis coturniculus	--/ST/FP	Nests in high portions of salt marshes, shallow freshwater marshes, wet meadows, and flooded grassy vegetation Known from east of Yolo Bypass and southwest of Yolo Bypass	Operations
Song Sparrow (Modesto population) Melospiza melodia	--/--/SSC	Suitable nesting and foraging habitat in the construction study area; observed at the FWWA and Agricultural Road Crossing 1 Known from the Yolo Bypass	Construction + Operations
Long-billed Curlew Nemenius americanus	--/--/SSC	Suitable foraging habitat in the construction study area Known from the Yolo Bypass	Construction + Operations
Black-crowned Night-heron Nycticorax nycticorax	--/--/--	Suitable nesting and foraging habitat in the construction study area Known from the Yolo Bypass	Construction + Operations
Osprey Pandion haliaetus	--/--/SSC	Suitable foraging habitat in the construction study area, especially during winter floods; observed at the FWWA Known from the Yolo Bypass	Construction + Operations
American White Pelican Pelecanus erythrorhynchos	--/--/SSC	Known to forage in the construction study area, especially in mid-summer; observed at the FWWA Known from the Yolo Bypass	Construction + Operations
White-faced Ibis Plegadis chihi	--/--/SSC	Suitable nesting and foraging habitat in the construction study area; observed at the FWWA and Agricultural Road Crossing 1 Known from the Yolo Bypass	Construction + Operations
Double-crested Cormorant Phalacrocorax auritus	--/--/SSC	Suitable foraging habitat in the construction study area; observed at the FWWA and Agricultural Road Crossing 1 Known from the Yolo Bypass	Construction + Operations

Common Name Scientific Name	Status (Federal/State/Other)	Potential for Occurrence	Study Area
Purple Martin Progne subis	--/--/SSC	Suitable nesting and foraging habitat in the construction study area Suitable nesting habitat in the Yolo Bypass	Construction + Operations
Bank Swallow Riparia riparia	--/ST/--	Suitable nesting and foraging habitat in the construction study area; colony observed along banks of the Sacramento River opposite the Fremont Weir Known from the Yolo Bypass	Construction + Operations
Least Bell's Vireo Vireo bellii pusillus	FE/SE/--	Suitable nesting and foraging habitat in the construction study area Known from the South Fork of Putah Creek	Construction + Operations
Yellow-headed Blackbird Xanthocephalus xanthocephalus	--/--/SSC	Suitable nesting and foraging habitat in the construction study area Suitable habitat in the Yolo Bypass	Construction + Operations
Mammals			
Pallid bat Antrozous pallidus	--/--/SSC	Suitable roosting and foraging habitat in the construction study area Suitable habitat in the Yolo Bypass	Construction + Operations
Townsend's big-eared bat Corynorhinus townsendii	--/--/SSC	Suitable foraging habitat in the construction study area Suitable habitat in the Yolo Bypass	Construction + Operations
Silver-haired bat Lasionycteris noctivagans	--/--/--	Suitable roosting and foraging habitat in the construction study area Suitable habitat in the Yolo Bypass	Construction + Operations
Western red bat Lasiurus blossevillii	--/--/SSC	Suitable roosting and foraging habitat in the construction study area Suitable habitat in the Yolo Bypass	Construction + Operations

Common Name Scientific Name	Status (Federal/State/Other)	Potential for Occurrence	Study Area
Hoary bat Lasiurus cinereus	--/--/--	Suitable roosting and foraging habitat in the construction study area Suitable habitat in the Yolo Bypass	Construction + Operations
American badger Taxidea taxus	--/--/SSC	Suitable burrowing and foraging habitat in the construction study area Suitable habitat in the Yolo Bypass	Construction + Operations

Key: BCC = Federal Bird of Conservation Concern; FC = Federal candidate for listing; FD = Federally delisted; FE = Federally endangered; FT = Federally threatened; FWWA = Fremont Weir Wildlife Area; SE = State endangered; SFP = State Fully Protected under the California Fish and Game Code; SSC = Species of Special Concern by CDFW; ST = State threatened; UR = under review for listing; YBWA = Yolo Bypass Wildlife Area.

9.1.3 Wildlife Movement Corridors

Wildlife movement corridors, also called dispersal corridors or landscape linkages, are linear features whose primary wildlife function is to connect at least two habitat areas (Beier and Loe 1992). These corridors increase connectivity between patches that have become isolated by habitat fragmentation, caused primarily by urbanization, agriculture, and forestry. They function by facilitating the movement of individuals through dispersal and migration to maintain gene flow and diversity between local populations. Other definitions of corridors and linkages are as follows:

- A corridor is a specific route that is used for movement and migration of species. A corridor might be different from a "linkage" because it represents a smaller or narrower avenue for movement.
- A linkage is a habitat area that provides connectivity between habitat patches and year-round foraging, reproduction, and dispersal habitat for resident plants and animals. "Linkage" shall mean an area of land that supports or contributes to the long-term movement of wildlife and genetic material.

Wildlife corridors and linkages are important features in the landscape, and the viability and quality of a corridor or linkage depends on site-specific factors. Topography and vegetative cover are important factors for corridors and linkages. These factors should provide cover for both predator and prey species. They should direct animals to areas of contiguous open space or resources and away from humans and development. The corridor or linkage should be buffered from human encroachment and other disturbances (e.g., light, loud noises, and domestic animals) associated with developed areas that have caused habitat fragmentation (Schweiger et al. 2000). Wildlife corridors and linkages can function at various levels, depending on these factors and, for this reason, the most successful wildlife corridors and linkages will accommodate all or most of the necessary life requirements of predator and prey species.

Width and connectivity are assumed to be the primary factors of an effective corridor and with that connectivity should also include the concept of stepping stone reserves for pollinators, seed dispersers, and other flying species such as birds, bats, and insects (Soulé 2003). The level of

connectivity needed to maintain a population of a species will vary with the demography of the population, including population size, survival and birth rates, and genetic factors such as the level of inbreeding and genetic variance (Rosenberg et al. 1997). Areas not considered as functional wildlife dispersal corridors or linkages are typically obstructed or isolated by concentrated development and heavily traveled roads, known as chokepoints. One of the worst scenarios for dispersing wildlife occurs when a large block of habitat leads animals into "cul-de-sacs" of habitat surrounded by development. These habitat cul-de-sacs frequently result in increased human-animal interactions in which humans, domesticated wildlife, and native wildlife could be harmed or killed.

The study area is adjacent to a natural waterway (Sacramento River) that is likely used by resident and migratory birds as a wildlife corridor, although it is narrow and leads directly into urban areas and roadways downstream. The Yolo Bypass serves as an important wildlife movement corridor that provides connectivity for resident and migratory wildlife throughout the region. Federally and State-listed terrestrial species that might use this movement corridor include valley elderberry longhorn beetle, giant garter snake, Least Bell's Vireo, and Western Yellow-Billed Cuckoo. In addition, the Yolo Bypass is expected to serve as a corridor for SSCs, birds protected under the MBTA, and common wildlife species.

9.1.4 Sensitive Habitats

Sensitive habitat types include those that are of special concern to CDFW or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, the Porter-Cologne Act, and/or Section 404 of the CWA, as discussed in Section 9.2, *Regulatory Setting*. Sensitive habitats might be of special concern to regulatory agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status or because they provide important habitat to common and special-status plant and wildlife species.

CDFW maintains a list of plant communities native to California. Within that list, CDFW identifies *special-status plant communities* (also known as sensitive natural communities), which it defines as communities that are of limited distribution statewide or within a county or region and that are often vulnerable to the environmental effects of projects (CDFW 2009). These communities might or might not contain special-status species or their suitable habitat characteristics. Special-status plant communities are tracked in the CNDDB, a statewide inventory of the locations and conditions of the State's rarest plant and animal taxa and vegetation types. Many wetland and riparian plant communities are included on CDFW's list of special-status plant communities, and the importance of protecting and preserving riparian and oak woodland habitats is recognized in Yolo County's General Plan policies.

The following vegetation communities are in the study area and are considered sensitive habitats:

- Black willow thickets
- Box elder forest
- California and hardstem bulrush marsh
- Fremont cottonwood forest
- Mixed hardwood forest

- Sandbar willow thickets
- Valley oak woodland

9.1.5 Wetlands and Other Waters of the United States and Waters of the State

DWR conducted a wetland delineation in May 2016 for a nearby project (Fremont Weir Adult Fish Passage Modification Project). This wetland delineation was conducted over a small portion of the study area for the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project. To the extent that these data overlapped with the study area, they were used to determine USACE jurisdiction. For the remainder of the study area, vegetation community mapping, National Wetlands Inventory data, and United States Forest Service historical topographic maps were used to make a comparison among the Project alternatives.

The following vegetation communities are considered waters of the United States subject to regulation by USACE and RWQCB under Sections 404 and 401 of the CWA, respectively, because they are hydrologically connected to the Sacramento River. These vegetation communities are also considered waters of the State subject to regulation by RWQCB under the Porter-Cologne Act:

- California and hardstem bulrush marsh
- Managed annual wetland vegetation
- Temperate freshwater floating mat
- Open water
- Water primrose wetlands

The following vegetation communities were determined by the Lead Agencies to potentially be under CDFW jurisdiction based on their association with riparian vegetation and their location within the Sacramento River floodplain:

- Black willow thickets
- Box elder forest
- California and hardstem bulrush marsh
- Fremont cottonwood forest
- Himalayan blackberry brambles
- Managed annual wetland vegetation
- Mixed hardwood forest
- Open water
- Sandbar willow thickets
- Temperate freshwater floating mat
- Valley oak woodland
- Water primrose wetlands

The actual limits of jurisdiction are determined by each regulatory agency.

Table 9-5 identifies the potential extent of jurisdictional wetlands of the United States, other waters of the United States, CDFW riparian (vegetated communities listed above), and CDFW unvegetated streambed (open water) in the study area. RWQCB jurisdiction is not included in Table 9-5 because, for 401 certifications, RWQCB jurisdiction coincides with Federal waters, but they do not have a clear definition for jurisdictional limits of state waters under the Porter-Cologne Act and may extend their limits to coincide with CDFW riparian habitat limits in addition to adding isolated wetlands.

Table 9-5. Potential USACE and CDFW Jurisdictional Areas in the Construction Study Area by Alternative

Potential Jurisdictional Acreages[a]	Alt. 1 (acres)	Alt. 2 (acres)	Alt. 3 (acres)	Alt. 4 (acres)	Alt. 5 (acres)	Alt. 6 (acres)
USACE Wetlands	**15.7**	**15.9**	**17.3**	**55.3**	**8.1**	**17.8**
California and hardstem bulrush marsh	11.6	10.9	10.9	10.9	5.4	11.1
Managed annual wetland vegetation	0.0	<0.001	1.4	39.2	<0.001	1.4
Temperate freshwater floating mat	1.8	1.8	1.8	1.8	1.0	1.8
Water primrose wetlands	2.2	3.2	3.2	3.4	1.7	3.5
USACE Non-wetland Waters of the United States	**0.7**	**7.3**	**1.6**	**10.9**	**6.1**	**2.9**
Open water	0.7	7.3	1.6	10.9	6.1	2.9
TOTAL USACE Jurisdiction	**16.4**	**23.2**	**18.9**	**66.2**	**14.2**	**20.7**
CDFW Riparian	**38.7**	**38.6**	**46.1**	**100.6**	**27.2**	**52.6**
Black willow thickets	<0.1	0.1	0.1	5.1	1.5	0.1
Box elder forest	0.0	0.0	0.7	0.7	0.0	1.4
California and hardstem bulrush marsh	11.6	10.9	10.9	10.9	5.4	11.1
Fremont cottonwood forest	17.7	17.1	21.3	32.2	15.0	25.5
Himalayan blackberry brambles	0.0	0.4	0.0	0.0	0.4	—0.0
Managed annual wetland vegetation	<0.001	<0.001	1.4	39.2	<0.001	1.4
Mixed hardwood forest	0.0	0.0	0.0	0.6	0.0	0.0
Sandbar willow thickets	0.0	0.0	0.0	0.0	0.0	0.0
Temperate freshwater floating mat	1.8	1.8	1.8	1.8	1.0	1.8
Valley oak woodland	5.4	5.1	6.7	6.7	2.2	7.8
Water primrose wetlands	2.2	3.2	3.2	3.4	1.7	3.5
CDFW Unvegetated Streambed	**0.7**	**7.3**	**1.6**	**10.9**	**6.1**	**2.9**
Open water	0.7	7.3	1.6	10.9	6.1	2.9
TOTAL CDFW Jurisdiction	**39.4**	**45.9**	**47.7**	**111.5**	**33.3**	**55.5**

[a] These acreages represent a preliminary effort at determining the jurisdictional boundaries in the absence of a formal jurisdictional delineation, using the most recent regulations, policy, and guidance from the regulatory agencies. However, only the regulatory agencies can make a final determination of jurisdictional boundaries.

Key: CDFW = California Department of Fish and Wildlife; USACE = United States Army Corps of Engineers

9.2 Regulatory Setting

This section discusses specific Federal, State, and local laws, regulations, policies, plans, or executive orders that affect, or could affect, how terrestrial biological resources would be impacted, used, or managed during implementation of the Project alternatives.

9.2.1 Federal Plans, Policies, and Regulations

Federal Endangered Species Act. USFWS and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) enforce the provisions stipulated in the Federal Endangered Species Act of 1973 (ESA (16 United States Code [USC] Section 1531 et seq.). Threatened and endangered species on the Federal list (50 Code of Federal Regulations [CFR] Parts 17.11 and 17.12) are protected from *take*. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Through regulations, the term "harm" is defined as "an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

Pursuant to the requirements of the ESA, an agency reviewing a proposed action within its jurisdiction must determine whether any Federally listed species might be present in the project site and determine whether the proposed action could adversely affect such species. Under the ESA, habitat loss is considered an impact to a species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species that is proposed for listing under the ESA or to result in the destruction or adverse modification of critical habitat proposed or designated for such species (16 USC Section 1536[3] and [4]).

Executive Order 11990: Protection of Wetlands. Executive Order 11990, signed May 24, 1997, directs Federal agencies to refrain from assisting in or giving financial support to projects that encroach on publicly or privately-owned wetlands. It further requires that Federal agencies support a policy to minimize the destruction, loss, or degradation of wetlands. A project that encroaches on wetlands may not be undertaken unless the agency has determined that: 1) there are no practicable alternatives to construction, 2) the project includes all practicable measures to minimize harm to wetlands affected, and 3) the impact would be minor.

Fish and Wildlife Coordination Act. The Fish and Wildlife Coordination Act (FWCA) ensures that fish and wildlife receive equal consideration with water resources development during planning and construction of Federal water projects by requiring that the Federal agencies consult with USFWS and the State wildlife resources agency before the waters of any stream or other body of water are impounded, diverted, deepened, or otherwise controlled or modified. The FWCA requires that the views of USFWS and the State agency be considered when evaluating impacts and determining mitigation needs. NEPA regulations further require that an EIS meet the consultation requirements of the FWCA.

Clean Water Act, Sections 404 and 401. Wetlands and other waters of the United States are protected under Section 404 of the CWA. Any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands, is subject to regulation by USACE. *Waters of the United States* is defined to encompass navigable waters of the United States; interstate waters; all other waters where their use, degradation, or destruction could affect

interstate or foreign commerce; tributaries of any of these waters; and wetlands that meet any of these criteria or are adjacent to any of these waters or their tributaries. *Wetlands* are defined under Section 404 as those areas that are inundated or saturated by surface water or groundwater 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. Jurisdictional wetlands must meet three wetland delineation criteria:

- They support hydrophytic vegetation (i.e., plants that grow in saturated soil).
- They have hydric soil types (i.e., soils that are wet or moist enough to develop anaerobic [oxygen-free] conditions).
- They have wetland hydrology (i.e., conditions of flooding, inundation, or saturation that support wetland communities).

The extent of USACE's jurisdiction extends to the ordinary high-water mark—the line on the shore established by fluctuations of water and indicated by a clear, natural line impressed on the bank, shelving, changes in soil character, destruction of terrestrial vegetation, and/or the presence of litter and debris.

To support a Section 404 permit from USACE, the project proponent submits a wetland delineation report to be verified by USACE and subsequently submits a permit application.

Activities requiring a Section 404 permit must obtain certification from the government of the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate pursuant to Section 401 of the CWA. For the Project, the Central Valley RWQCB would have to issue such certification prior to the alteration of or discharge to waters of the United States and waters of the State (i.e., work involving bridge crossings of jurisdictional waters).

The Clean Water Rule: Definition of "Waters of the United States" was published in the Federal Register on June 29, 2015[2]. The rule became effective on August 28, 2015. Since publication of the rule in the Federal Register, numerous lawsuits were filed challenging the regulation, and on October 9, 2015, a Federal appeals court (6th Circuit) issued a nationwide stay of the 2015 Clean Water Rule. The United States Environmental Protection Agency (USEPA) and USACE issued a joint memorandum on November 16, 2015 (USEPA and USACE 2015), stating that "[d]uring the pendency of the stay, as the agencies implement the prior regulatory definition of 'waters of the United States' as clarified by the 2008 *Rapanos* Guidance, the agencies should follow the 2007 Army-EPA joint memorandum on coordination[3] as modified by the January 2008 Corps of

[2] June 29, 2015 Clean Water Rule: Definition of "Waters of the United States," available at https://www.federalregister.gov/documents/2015/06/29/2015-13435/clean-water-rule-definition-of-waters-of-the-united-states

[3] June 5. 2007, Army-USEPA joint guidance clarifying coordination on CWA jurisdiction after *Rapanos*. http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/rapanos_guide_memo.pdf.

Engineers memorandum.[4]" Subsequently, in response to the February 28, 2017 Executive Order on Restoring the Rule of Law, Federalism, and Economic Growth by Reviewing the "Waters of the United States" Rule[5], the USEPA and USACE published a proposed rule on July 27, 2017[6] to rescind the 2015 Clean Water Rule and return to prior regulatory language and practice. The agencies have also begun deliberations and outreach regarding a re-evaluation and revision of the definition of "waters of the United States" in accordance with the Executive Order that may result in a revised definition being proposed at an indeterminate time in the future. The jurisdictional limits proposed herein are consistent with current guidance and the proposed rule.

Rivers and Harbors Act. Under Section 10 of the Rivers and Harbors Act of 1899, construction of any structure in or over any navigable waters of the United States requires advance authorization from USACE. This act applies to dredging, excavation, filling, or other modifications to navigable waters of the United States, including installation of or changes to structures and bank protection (e.g., riprap).

Executive Order 13186: Migratory Bird Treaty Act. Under the MBTA of 1918 (16 USC Sections 703 to 712), migratory bird species and their nests and eggs are protected from injury or death; these species are identified on the Federal Migratory Bird Treaty Act Protected Bird Species list (50 CFR Part 10.13). This prohibition includes both direct and indirect acts although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs.

The current list of species protected by the MBTA can be found in the March 1, 2010 Federal Register (75 Federal Register 9281). This list contains several hundred species, including essentially all United States native birds. Permits for take of nongame migratory birds can be issued only for specific activities such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and of personal property. USFWS publishes a list of birds of conservation concern (BCC) to identify migratory nongame birds that are likely to become candidates for listing under the ESA without additional conservation actions. The BCC list is intended to stimulate coordinated and collaborative conservation efforts among Federal, State, tribal, and private parties.

Executive Order 13112: Invasive Species Prevention. On February 3, 1999, Executive Order 13112[7] was signed, establishing the National Invasive Species Council. Executive Order 13112 required that each Federal agency identify actions they take that could affect the status of invasive species. In addition, subject to the availability of appropriations, each Federal agency was tasked with using relevant programs and authorities to: "(i) prevent the introduction of

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[4] January 28, 2008, USACE memorandum modifying EPA/USACE jurisdiction coordination after *Rapanos*, available at http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/jd_coord_proc_28jan08.pdf.

[5] February 28, 2017, Presidential Executive Order on Restoring the Rule of Law, Federalism, and Economic Growth by Reviewing the "Waters of the United States" Rule, available at https://www.whitehouse.gov/the-press-office/2017/02/28/presidential-executive-order-restoring-rule-law-federalism-and-economic

[6] July 27, 2017. Definition of "Waters of the United States" – Recodification of Pre-Existing Rules, available at https://www.federalregister.gov/documents/2017/07/27/2017-13997/definition-of-waters-of-the-united-states-recodification-of-pre-existing-rules.

[7] February 3, 1999, Executive Order 13112, available at https://www.gpo.gov/fdsys/pkg/FR-1999-02-08/pdf/99-3184.pdf.

invasive species, (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner, (iii) monitor invasive species populations accurately and reliably, (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded, (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species, and (vi) promote public education on invasive species and the means to address them." Executive Order 13112 also required that each Federal Agency "not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions."

On December 5, 2016, an executive order was issued to maintain the original intent of Executive Order 13112 regarding Federal prevention and invasive species control efforts. It also expanded the membership of the Invasive Species Advisory Committee, clarifying the operations of the National Invasive Species Council and incorporating additional considerations of climate change and technological innovation to address threats from invasive species. On September 29, 2017, an executive order was issued to continue the Invasive Species Advisory Committee through September 30, 2019[8].

9.2.2 State Plans, Policies, and Regulations

California Endangered Species Act. CESA of 1970 (Fish and Game Code Section 2050 et seq. and CCR Title 14, Subsections 670.2 and 670.5) prohibits the take of species (interpreted to mean the direct killing of a species) listed under CESA (CCR Title 14, Subsections 670.2 and 670.5). Consultation ensures that proposed projects or actions do not have a negative effect on State-listed species. During consultation, USFWS determines whether take would occur and identifies "reasonable and prudent alternatives" for the project and conservation of special-status species (16 USC Section 1536 (d)). CDFW can authorize take of a State-listed species under Sections 2080.1 and 2081(b) of the Fish and Game Code in those cases where it is demonstrated that the impacts are minimized and mitigated. Take that is authorized under either 16 USC Section 1536 (d) or under Fish and Game Code Section 2081(b) must be minimized and fully mitigated.

A CESA permit must be obtained if a project would result in the *take* of listed species, either during construction or over the life of the project. Under CESA, the Fish and Game Commission is responsible for maintaining a list of threatened and endangered species designated under State law (CDFG Code 2070). CDFW also maintains lists of SSCs, which serve as watch lists.

California Environmental Quality Act. CEQA of 1970 (Subsection 21104.2) requires that CDFW be consulted during the CEQA review process regarding impacts of proposed projects on rare or endangered species. These *special-status* species are defined under CEQA Guidelines Subsections 15380(b) and (d) as those listed under the ESA and the CESA and species that are

[8] September 29, 2017. Presidential Executive Order on the Continuance of Certain Federal Advisory Committees, available at https://www.whitehouse.gov/the-press-office/2017/09/29/presidential-executive-order-continuance-certain-federal-advisory.

not currently protected by statute or regulation but would be considered rare, threatened, or endangered under these criteria or by the scientific community. Pursuant to the requirements of CEQA, a State or local agency reviewing a proposed project within its jurisdiction must determine whether any state-listed species might be present in the biological survey area and determine whether the proposed project would have a potentially significant impact to such species.

Although threatened and endangered species are protected by specific Federal and State statutes, CEQA Guidelines Section 15380(d) provides that a species that is not Federally or State-listed could be considered rare or endangered if it can be shown to meet certain specified criteria. These criteria have been modeled after the definition in the Federal ESA and the section of the California Fish and Game Code pertaining to rare or endangered plants and animals. Section 15380(d) allows a public agency to undertake a review to determine whether a significant effect would occur on species that have not yet been listed by either USFWS or CDFW (i.e., candidate species). Thus, CEQA provides an agency with the ability to protect a species from the potential impacts of a project until the respective government agency has an opportunity to designate the species as protected, if warranted. Plants with a 1A, 1B, 2A, and 2B designation meet the standards for rarity under CEQA Section 15380(b).

Porter-Cologne Water Quality Control Act. Under the Porter-Cologne Act definition, *waters of the State* are "any surface water or groundwater, including saline waters, within the boundaries of the state." Although all waters of the United States that are within the borders of California are also waters of the State, the reverse is not true. Therefore, the State of California retains authority to regulate discharges of waste into any waters of the State, regardless of whether USACE has concurrent jurisdiction under Section 404 of the CWA, and defines *discharges to receiving waters* more broadly than the CWA does.

Waters of the State fall under the jurisdiction of the nine RWQCBs. Under this act, each RWQCB must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater as well as actions to control nonpoint and point sources of pollution. California Water Code Section 13260 requires any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the State to file a report of discharge (an application for waste discharge requirements) with the applicable RWQCB. California Water Code Section 13050 authorizes the State Water Board and the affiliated RWQCB to regulate biological pollutants. One example of this kind of pollutant is aquatic invasive plants discharged to receiving waters. Construction and restoration activities associated with a project that might discharge wastes into the waters of the State must meet the discharge control requirements of the Porter-Cologne Act.

Sensitive Habitats. Sensitive habitat types include those that are of special concern to CDFW or that are afforded specific consideration through CEQA as indicated by State rarity rankings,[9] Section 1602 of the California Fish and Game Code, the Porter-Cologne Act, and/or Section 404 of the CWA. Sensitive habitats might be of special concern to regulatory agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status or because they provide important habitat to common and special-status species.

[9] All alliances with state ranks of S1 to S3 are considered to be highly imperiled.

California Fish and Game Code (Lake and Streambed Alteration). The California Fish and Game Code was enacted in 1957. Many of its provisions are derived from the 1947 former Fish and Game Code as well as older statutes under the former Penal and Political codes originally enacted in 1872. The new statutes relating to more modern topics, such as endangered species, were added later.

Sections 1602 and 1611 of the California Fish and Game Code require notifying CDFW prior to any project activity that would substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it could pass into any river, stream, or lake. This requirement includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It could also apply to work undertaken in the floodplain of a body of water.

California Fish and Game Code (Bird and Nest Protection). California Fish and Game Code Subsections 3503, 3503.5, and 3800 prohibit the possession, incidental take, or needless destruction of birds, their nests, and eggs.

California Fish and Game Code (Invasive Species). CDFW is one of the primary State agencies responsible for State efforts to prevent the introduction of new invasive species, detect and respond to introductions when they occur, and manage and prevent the spread of established invasive species. This responsibility is derived from California Fish and Game Code Sections 2116 to 2127, 2150 to 2157, 2185 to 2195, 2270 to 2272, 2300 to 2302, 6400 to 6403, and 15000 et seq. These sections relate to the importation, transfer, and possession of live wild animals, aquatic plants, and fish into the State; the placement of live aquatic animals and plants in State waters; and the operation of aquaculture industries.

California Fully Protected Species. California Fish and Game Code Section 3511 lists birds that are "fully protected" as those that may not be taken or possessed except under specific permit. Sections 4700, 5050, and 5515 of the California Fish and Game Code prohibit take or possession of other fully protected species and do not provide for authorization of incidental take except for take of fully protected mammal, reptiles, amphibians, or fish for necessary scientific research, including efforts to recover fully protected, threatened, or endangered species.

California Native Plant Protection Act. The California Native Plant Protection Act of 1977 (CDFG Code Sections 1900 to 1913) directed the Fish and Game Commission to use their authority to designate plants as rare or endangered to "preserve, protect, and enhance" these species. Under Section 1901, a species is *endangered* when its prospects for survival and reproduction are in immediate jeopardy from one or more causes. A species is *rare* when, although not threatened with immediate extinction, it exists in such small numbers throughout its range that it could become endangered if its present environment worsens. The Fish and Game Commission has designated 64 species, subspecies, and varieties of plants that are protected as rare under the California Native Plant Protection Act (Title 14 CCR Section 670.2(c)). Take of rare plants can only be authorized under Title 14 CCR Section 786.9.

Delta Protection Act of 1992. The Delta Protection Act of 1992 (Water Code Section 12220) established the Delta Protection Commission (DPC) to prepare and oversee a comprehensive Land Use and Resources Management Plan (LURMP) for the Delta Primary Zone. The Primary Zone consists of the lands in the Delta's central portion that were not within either the urban limit line or sphere of influence line of any local government's general plan or studies as of

January 1, 1992. The Primary Zone encompasses 487,625 acres (about 66 percent of the statutory Delta) of varied land uses, waterways, and levees in parts of Contra Costa, Sacramento, San Joaquin, Solano, and Yolo counties, including portions of Yolo Bypass south of I-80. The remaining areas of the legal Delta are designated as the Secondary Zone and are not under DPC land use jurisdiction (DPC 2010).

In 1995, the DPC adopted a LURMP for the Primary Zone to guide projects impacting land use and resource management, including agriculture, wildlife habitat, and recreation. Emphasis was placed on agriculture, which was designated by the Delta Protection Act as the primary use of this zone. In 2000, the LURMP policies were adopted as regulations (CCR Title 14, Division 9, Chapter 3: *Regulations Governing Land Use and Resources Management in the Primary Zone of the Sacramento-San Joaquin Delta*); the plan was revised and reprinted in 2002.

The Delta Protection Act was amended in 2009 by the Sacramento-San Joaquin Delta Reform Act (Senate Bill [SB] 1 X7), which modified DPC's composition and responsibilities. DPC has since adopted an updated LURMP, which became effective on November 6, 2010. It contains policies to protect the Delta's unique character, expand public access and recreation, and locate new transmission lines and utilities within existing corridors to minimize impacts (DPC 2010). These policies are required to be incorporated into the local general plans of the counties with jurisdiction over portions of the Primary Zone. Local planning decisions may be appealed to DPC for a determination of consistency with the LURMP.

Delta Plan. Signed by the governor of California in 2009, the Sacramento-San Joaquin Delta Reform Act (Water Code Section 85000 et seq.) created a new Delta Stewardship Council (DSC) and gave this body broad oversight of Delta planning and resource management. DSC was tasked with developing and implementing a long-term, comprehensive management plan (Delta Plan) that emphasizes the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" (Water Code Section 85300[a]) as the foundation for State decisions regarding Delta management.

Among other things, the Reform Act contains three specific mandates for the DSC:

- Include measures in the Delta Plan to promote statewide water conservation, water use efficiency, sustainable use of water, and improvements to water conveyance/storage and operation, to achieve the coequal goals.
- Include measures in the Delta Plan that attempt to reduce risks to people, property, and State interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments.
- Determine whether State or local agency projects are consistent with the Delta Plan.

In addition, the Reform Act requires the Delta Plan to cover five topic areas and goals:

- Increased water supply reliability
- Restoration of the Delta ecosystem
- Improved water quality
- Reduced risks of flooding in the Delta
- Protection and enhancement of the Delta

The final Delta Plan was adopted on May 16, 2013, and DSC is still preparing the associated EIR. Following adoption of the Delta Plan, covered actions are required to be consistent with that plan.

Yolo Bypass Wildlife Area Land Management Plan. The YBWA Land Management Plan was finalized in June 2008 (CDFG 2008). The plan is a general policy guide to CDFW management of YBWA and is intended to contribute to habitat management that uses natural processes to create a sustainable system over the long term. The policies are based on an ecosystem approach to habitat management consistent with the principles of the Ecosystem Restoration Program included in CALFED as implemented by the California Bay-Delta Authority and CDFW.

9.2.3 Regional and Local Plans, Policies, and Regulations

The Project alternatives are in unincorporated Yolo County; therefore, the county's policies pertaining to terrestrial biological resources are discussed in further detail below.

9.2.3.1 Yolo County General Plan

The following goals and policies of the Conservation and Open Space Element of the *2030 Countywide General Plan* (County of Yolo 2009) are applicable to the terrestrial biological resources that could be affected by the Project alternatives:

- **Policy CO-2.1.** Consider and maintain the ecological function of landscapes, connecting features, watersheds, and wildlife movement corridors.
- **Policy CO-2.2.** Focus conservation efforts on high priority conservation areas (core reserves) that consider and promote the protection and enhancement of species diversity and habitat values and contribute to sustainable landscapes connected to each other and to regional resources.
- **Policy CO-2.3.** Preserve and enhance those biological communities that contribute to the county's rich biodiversity, including blue oak and mixed oak woodlands, native grassland prairies, wetlands, riparian areas, aquatic habitat, agricultural lands, heritage valley oak trees, remnant valley oak groves, and roadside tree rows.
- **Policy CO-2.4.** Coordinate with other regional efforts (for example, Yolo County Habitat Conservation Plan [HCP]/ Natural Community Conservation Plan [NCCP]) to sustain or recover special-status species populations by preserving and enhancing habitats for special-status species.
- **Policy CO-2.9.** Protect riparian areas to maintain and balance wildlife values.
- **Policy CO-2.10.** Encourage the restoration of native habitat.
- **Policy CO-2.11.** Ensure that open space buffers are provided between sensitive habitat and planned development.
- **Policy CO-2.13.** Promote the use of oak woodland conservation banks to mitigate for losses due to development impacts and provide carbon sequestration for greenhouse gas emissions under applicable State programs.

- **Policy CO-2.14.** Ensure no net loss of oak woodlands, alkali sinks, rare soils, vernal pools, or geological substrates that support rare endemic species, with the exception that limited loss of blue oak woodland and grasslands may be acceptable where the fragmentation of large forests exceeding 10 acres is avoided and where losses are mitigated.
- **Policy CO-2.16.** Existing native vegetation shall be conserved where possible and integrated into new development if appropriate.
- **Policy CO-2.17.** Emphasize and encourage the use of wildlife-friendly farming practices within the county's agricultural districts and with private landowners, including:
  - Establishing native shrub hedgerows and/or tree rows along field borders
  - Protecting remnant valley oak trees
  - Planting tree rows along roadsides, field borders, and rural driveways
  - Creating and/or maintaining berms
  - Winter flooding of fields
  - Restoring field margins (filter strips), ponds, and woodlands in non-farmed areas
  - Using native species and grassland restoration in marginal areas
  - Managing and maintaining irrigation and drainage canals to provide habitat, support native species, and serve as wildlife movement corridors
  - Managing winter stubble to provide foraging habitat
  - Discouraging the conversion of open ditches to underground pipes, which could adversely affect giant garter snakes and other wildlife that rely on open waters
  - Widening watercourses, including the use of setback levees
- **Policy CO-2.18.** Coordinate with the Yolo County Resource Conservation District, Natural Resources Conservation Service, University of California Cooperative Extension, and other farm organizations to encourage farming practices and the management of private agricultural land that is supportive of wildlife habitat values.
- **Policy CO-2.20.** Encourage the use of wildlife-friendly best management practices to minimize unintentional killing of wildlife, such as restricting mowing during nesting season for ground-nesting birds or draining of flooded fields before fledging of wetland species.
- **Policy CO-2.22.** Prohibit development within a minimum of 100 feet from the top of banks for all lakes, perennial ponds, rivers, creeks, sloughs, and perennial streams. A larger setback is preferred. The setback will allow for fire and flood protection, a natural riparian corridor (or wetland vegetation), a planned recreational trail where applicable, and vegetated landscape for stormwater to pass through before it enters the water body. Recreational trails and other features established in the setback should be unpaved and located along the outside of the riparian corridors whenever possible to minimize intrusions and maintain the integrity of the riparian habitat. Exceptions to this action include irrigation pumps, roads and bridges, levees, docks, public boat ramps, and similar uses, so long as these uses are sited and operated in a manner that minimizes impacts to aquatic and riparian features.

- **Policy CO-2.23.** Support efforts to coordinate the removal of non-native, invasive vegetation within watersheds and replace with native plants.
- **Policy CO-2.24.** Promote floodplain management techniques that increase the area of naturally inundated floodplains and the frequency of inundated floodplain habitat, restore some natural flooding processes-river meanders, and widen riparian vegetation, where feasible.
- **Policy CO-2.25.** Support efforts to reduce water temperatures in streams for fish via habitat restoration (for example, increase shading vegetation) and water management (for example, control of flows) that are compatible with the Integrated Regional Water Management Plan.
- **Policy CO-2.26.** Coordinate with local watershed stewardship groups to identify opportunities for restoring or enhancing watershed, instream, and riparian biodiversity.
- **Policy CO-2.27.** Evaluate the need for additional water to support future riparian enhancement efforts, including the benefits of conjunctive management of groundwater and surface water resources.
- **Policy CO-2.28.** Balance the needs of aquatic and riparian ecosystem enhancement efforts with flood management objectives.
- **Policy CO-2.29.** Promote native perennial grass habitat restoration and controlled fire management in grazing lands to reduce invasive species cover and enhance rangeland forage.
- **Policy CO-2.30.** Protect and enhance streams, channels, seasonal and permanent marshland, wetlands, sloughs, riparian habitat, and vernal pools in land planning and community design.
- **Policy CO-2.31.** Protect wetland ecosystems by minimizing erosion and pollution from grading, especially during grading and construction projects.
- **Policy CO-2.33.** Create partnerships with landowners, non-government organizations, and other public agencies to implement the *Yolo County Oak Woodland Conservation and Enhancement Plan*.
- **Policy CO-2.34.** Recognize, protect, and enhance the habitat value and role of wildlife migration corridors for the Sacramento River, Putah Creek, Willow Slough, the Blue Ridge, the Capay Hills, the Dunnigan Hills, and Cache Creek.
- **Policy CO-2.35.** Consider potential effects of climate change on the locations and connections between wildlife migration routes.
- **Policy CO-2.36.** Habitat preserved as a part of any mitigation requirements shall be preserved in perpetuity through deed restrictions, conservation easement restrictions, or other methods to ensure that the habitat remains protected. All habitat mitigation must have a secure, ongoing funding source for operation and maintenance.
- **Policy CO-2.37.** Where applicable in riparian areas, ensure that required State and Federal permits/approvals are secured prior to development of approved projects.
- **Policy CO-2.38.** Avoid adverse impacts to wildlife movement corridors and nursery sites (for example, nest sites, dens, spawning areas, and breeding ponds). Preserve the functional value of movement corridors to ensure that essential habitat areas do not become isolated

from one another due to the placement of either temporary or permanent barriers within the corridors. Encourage avoidance of nursery sites (for example, nest sites, dens, spawning areas, and breeding ponds) during periods when the sites are actively used and that nursery sites, which are used repeatedly over time, are preserved to the greatest feasible extent or fully mitigated if they cannot be avoided.

- **Policy CO-2.41.** Require that impacts to species listed under the California or Federal Endangered Species Acts, or species identified as special-status by the resource agencies, be avoided to the greatest feasible extent. If avoidance is not possible, fully mitigate impacts consistent with applicable local, State, and Federal requirements.

9.2.3.2 Yolo County Oak Woodland Conservation and Enhancement Plan

The Yolo County Board of Supervisors has adopted the *Yolo County Oak Woodland Conservation and Enhancement Plan* (Yolo County 2007). This voluntary program encourages the protection and growth of oak woodlands by providing financial incentives to landowners and establishing public outreach and educational programs. The plan coordinates the voluntary oak woodland conservation and enhancement efforts, guides oak woodland mitigation, provides access to State funding, and assists with State efforts to conserve and enhance oak woodlands in California. The system helps identify areas with the highest oak woodland resource values as well as those that would benefit from enhancement efforts. The system uses criteria that reflect values such as stand size, composition and distribution, tree cover and density, plant and wildlife habitat, invasive species presence and abundance, erosion control, contribution to air quality, water quality and flood protection, historical and cultural significance, and recreational opportunities.

9.2.3.3 Yolo Habitat Conservation Plan/Natural Community Conservation Plan

The Draft Yolo HCP/NCCP was released for public review in June 2017 by the Yolo Habitat Conservancy, whose members include the County of Yolo and the Cities of Davis, West Sacramento, Winters, and Woodland. Although the plan has not yet been adopted and there is no requirement under CEQA to analyze the Project with respect to a plan that has not been adopted, the consistency of this Project with the Draft Yolo HCP/NCCP is presented in this EIS/EIR. The public review comment period closed on August 30, 2017.

The Draft Yolo HCP/NCCP includes the following proposed covered species that may be present or are known to be present in the study area:

- Bank Swallow
- Burrowing Owl
- Giant garter snake
- Least Bell’s Vireo
- Swainson’s Hawk
- Tricolored Blackbird
- Valley elderberry longhorn beetle

- Western pond turtle
- Western Yellow-Billed Cuckoo
- White-tailed Kite

The Draft Yolo HCP/NCCP includes the following natural communities that are present in the study area:

- Annual grasslands
- Field crops
- Fresh emergent wetlands
- Grain/hay crops
- Rice
- Valley foothill riparian
- Valley oak woodland
- Water

9.3 Environmental Consequences

This section describes environmental consequences related to terrestrial vegetation, jurisdictional wetlands and waters, and wildlife resources, including direct (temporary, permanent, and temporal), potential indirect, and potential cumulative effects on terrestrial biological resources that could result from each Project alternative. This section also covers the methods that were used to determine the effects of the Project alternatives and the thresholds of significance. Effects from construction, operations, and maintenance are also addressed. This section also includes avoidance, minimization, and mitigation measures for effects considered adverse under NEPA and impacts considered significant under CEQA. Detailed descriptions of the alternatives evaluated in this section are provided in Chapter 2, *Description of Alternatives*.

9.3.1 Methods for Analysis

The analysis of impacts to terrestrial biological resources is arranged by resource type: vegetation communities, Federally and/or State-listed plant and wildlife species, other special-status plant and wildlife species, wildlife movement corridors and linkages, sensitive habitats, waters of the United States, waters of the State, and compliance with Federal, State, local, and regional plans, policies, and regulations.

The Lead Agencies used the following data sources to analyze impacts to terrestrial biological resources:

- Vegetation community and land cover acreages were obtained using the GIS data included in the *Fine-Scale Riparian Vegetation Mapping of the Central Valley Flood Protection Plan Area Final Report* CDFW (2013) and updated by field surveys conducted by DWR and HDR in 2014.

- Locations of special-status plant and wildlife species in the study area were based on focused surveys conducted by DWR and HDR in 2014 and 2015.
- Locations and dates of special-status plant and wildlife species occurrence information from CNDDB and CNPS were used to determine impacts to suitable habitat for special-status species for which no recent survey data were available.
- A jurisdictional delineation conducted by DWR in 2016 was used to determine the extent of wetlands, non-wetland waters of the United States, and waters of the State (this delineation covered only a small portion of the study area).
- Vegetation community mapping (CDFW 2013), National Wetlands Inventory data, and USGS historical topographic maps were used to determine the area potentially subject to USACE and CDFW jurisdiction where formal delineation data were unavailable.

To identify potential construction-related direct and indirect impacts to biological resources, the Lead Agencies identified a study area. This biological resources study area includes all areas within the proposed footprint for each alternative (including construction footprints for all Project components—intake habitat shelf, headworks structure, outlet channel, transport channel, downstream channel improvements, the Tule Canal floodplain improvement area, notches, water control structures, engineered embankments, pedestrian bridges, cutoff walls, and fish passage structures; spoils sites; access roads; and temporary staging and construction areas) as well as a buffer area for the assessment of indirect impacts (typically 100 feet for vegetation communities, jurisdictional areas, and special-status plant species, and up to 500 feet for certain special-status wildlife species such as birds). To assess operations impacts, the study area includes the entirety of the Yolo Bypass. However, only the part of the study area associated with construction impacts is shown in the figures in this chapter.

Direct effects are changes in the physical environment caused by a project that are immediately related to the project; they occur in the same time and place as the project (e.g., grading associated with construction of a project or permanent conversion of habitat to another use). Indirect effects are changes to the physical environment that occur later in time or are farther removed in distance than direct effects (e.g., long-term changes in water quality or offsite impacts from noise, dust, lights). Both direct and indirect effects could be considered temporary or permanent, depending on the situation.

Temporary impacts to vegetation communities typically include those of short duration (less than one year) in areas that are subject to disturbance during construction but that can be recontoured and revegetated following construction. Temporary impacts that cover a period longer than one year are typically considered long-term temporary impacts and could involve additional mitigation measures to account for the loss of habitat function during construction. Because construction of all alternatives is anticipated to take about one year to complete, long-term temporary impacts are not anticipated.

Temporary impacts to wildlife species can include indirect effects such as noise or disturbance from operating construction equipment. Permanent impacts to vegetation communities include those that involve placing materials, such as concrete or rock, which would result in converting one vegetation community to another. Permanent impacts to wildlife include those that convert suitable habitat to the extent that it is no longer suitable for wildlife or cause mortality to individuals.

Direct effects on vegetation communities (including sensitive natural communities), special-status plant and wildlife species, and jurisdictional areas can include vegetation clearing, site grading, excavating, paving, placing fill, and stockpiling. Indirect effects on vegetation communities (including sensitive natural communities), special-status plant and wildlife species, and jurisdictional areas can include soil compaction, dust, runoff, the introduction and spread of invasive plant species, construction noise and lighting, habitat conversion, and changes in hydrology.

The Lead Agencies determined the effects under NEPA of each Project alternative on terrestrial biological resources by comparing each alternative with the effects of the future No Action Alternative (the NEPA baseline). The Lead Agencies determined the impacts and their level of significance under CEQA of each alternative to terrestrial biological resources by comparing each alternative to existing biological conditions (the CEQA baseline). For this analysis, the NEPA and CEQA terrestrial biological baselines are equivalent because without a project to alter inundation within the study areas, there are not anticipated to be any changes to terrestrial biological resources for the future No Action compared to current terrestrial biological conditions. Therefore, the analysis compares the impacts of the action alternatives only to existing conditions.

If the Lead Agencies identify a significant effect, the section includes mitigation measures that could reduce, avoid, or minimize the effect. It is recognized that the mitigation measures may be refined as part of ESA/CESA permitting; this will be subject to final design, further coordination with resource agencies, and additional modeling maps specific to the species that may be developed.

The Lead Agencies determined the cumulative effects of each alternative by assessing the effects of the alternative in combination with other past, present, and probable or reasonably foreseeable future projects on a resource. The purpose of the cumulative effects analysis is twofold: to determine whether the overall long-term effects of all such projects would be cumulatively adverse and to determine whether the Project itself would cause a "cumulatively considerable" (and thus adverse) incremental contribution to any such cumulatively adverse effects (see the State CEQA Guidelines [CCR Title 14, Sections 15064(h), 15065(c), 15130(a), 15130(b), and 15355(b)]). In other words, the required analysis first creates a broad context in which to assess the Project's incremental contribution to anticipated cumulative effects, viewed on a geographic scale well beyond the Project itself. The analysis then determines whether the Project's incremental contribution to any adverse cumulative effects from all projects is itself adverse (i.e., "cumulatively considerable").

9.3.2 Thresholds of Significance – CEQA

The Lead Agencies used the following thresholds of significance identified in Appendix G of the State CEQA Guidelines and modified them based on thresholds used for other projects and conservation plans in the region (e.g., the Bay-Delta Conservation Plan /California WaterFix—refer to Chapter 2, *Description of Alternatives*, for a description of these projects) to determine the effects under CEQA of each Project alternative. These thresholds also encompass the factors considered under NEPA to determine the context and the intensity of an action's impacts.

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

- Have a substantial adverse effect, either through direct mortality or through habitat modifications, including designated critical habitat, on any terrestrial plant or wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by USFWS or CDFW, including substantially reducing the number or restricting the range of an endangered, threatened, or rare species. An adverse effect would be substantial if it would result in:
  - The adverse modification of critical habitat designated by the USFWS
  - A permanent reduction in the acreage and quality of suitable habitat for special-status plant species
  - A permanent reduction in the acreage and quality of suitable foraging and/or nesting habitat for special-status wildlife species
  - A permanent reduction in the acreage and quality of known occupied habitat for special-status plant or wildlife species
  - A permanent reduction in the availability of mature trees that provide suitable nesting or roosting habitat for special-status bird or bat species
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in Federal, State, local, or regional plans, policies, or regulations by USFWS or CDFW. An effect would be substantial if it would result in a permanent reduction in the acreage or function of the sensitive natural community.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree-preservation policy or ordinance, including the goals and policies of the Conservation and Open Space Element of the *2030 Countywide General Plan* (County of Yolo 2009) and the *Yolo County Oak Woodland Conservation and Enhancement Plan*.
- Have a substantial adverse effect on Federally or State-protected wetlands as regulated under Section 404 of the CWA or the Porter-Cologne Act, including, but not limited to, marshes, vernal pools, and coastal wetlands through their direct removal, filling, hydrological interruption, or other means. An effect would be substantial if it would result in the permanent reduction in acreage or function of the wetland.
- Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors or linkages or impede the use of native wildlife nursery sites.
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan.
- Result in effects on terrestrial biological resources that are individually limited but cumulatively considerable.

9.3.3 Effects and Mitigation Measures

This section provides an evaluation of the direct and indirect effects on vegetation, wetland, and wildlife resources from implementing the Project alternatives. This analysis is organized by Project alternative, with specific impact topics numbered sequentially under each alternative.

9.3.3.1 No Action Alternative

Under the No Action Alternative (see Section 2.2, *No Action and No Project Alternative*), no construction activities would occur to increase seasonal floodplain inundation in the lower Sacramento River Basin or improve fish passage through the Yolo Bypass. The Yolo Bypass would continue to be inundated during overtopping events at Fremont Weir. Additional flows would not pass through Fremont Weir when the Sacramento River is below the weir. There would be no construction impacts to terrestrial biological resources, including vegetation communities, special-status species, wildlife movement corridors, sensitive habitats, waters of the United States, and waters of the State.

The No Action Alternative would not result in changed conditions for terrestrial biological resources because there would not be any construction or changes to hydrology in the Yolo Bypass. Therefore, there would be no adverse effects to:

- Terrestrial plant or wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by USFWS or CDFW
- Riparian habitat or other sensitive natural community identified in Federal, State, local, or regional plans, policies, or regulations by USFWS or CDFW
- Federally or State-protected wetlands as regulated under Section 404 of the CWA or the Porter-Cologne Act
- The movement of any native resident or migratory wildlife species, established native resident or migratory wildlife corridors or linkages, or native wildlife nursery sites
- Local policies or ordinances protecting biological resources
- Provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan

CEQA Conclusion

The No Action Alternative would result in no changes to vegetation, wetland, or wildlife resources in the study area; therefore, this alternative would have **no impact** on terrestrial biological resources.

9.3.3.2 Alternative 1: East Side Gated Notch

Alternative 1, East Side Gated Notch, would allow increased flow from the Sacramento River to enter the Yolo Bypass through a gated notch on the east side of Fremont Weir. The invert of the new notch would be at an elevation of 14 feet, which is approximately 18 feet below the existing Fremont Weir crest. Alternative 1 would allow up to 6,000 cfs to flow through the notch during periods when the river levels are not high enough to go over the crest of Fremont Weir to provide open channel flow for adult fish passage. During operations, Alternative 1 would allow water through the headworks once Sacramento River water elevation exceeds 17 feet, into the eastern channel, through the transport channel, and past Agricultural Road Crossing 1. The gated notch would be closed when the river water elevation falls below 14 feet. The gated notch and associated water conveyance structures would be operated remotely from a control building between approximately November 1 and March 15, with gates potentially

remaining partially open after March 15 to allow fish passage at limited flows of 1,000 cfs. See Section 2.4 for more details on the alternative features.

Implementation of Alternative 1 would result in direct and indirect construction effects on suitable and/or occupied habitat for State- or Federally listed wildlife species, including giant garter snake, western pond turtle, Least Bell's Vireo, Swainson's Hawk, Western Yellow-Billed Cuckoo, Bank Swallow, special-status plant species (including woolly rose-mallow, northern California black walnut, bristly sedge, Peruvian dodder, Delta tule pea, Sanford's arrowhead, and Suisun Marsh aster), special-status bird species (including birds protected under the MBTA), and other special-status wildlife species (including bats and American badger). It would also result in direct and indirect construction effects on sensitive vegetation communities, including areas potentially subject to USACE and CDFW jurisdiction. The potential effects on these biological resources and proposed avoidance, minimization, and mitigation measures are discussed below.

Vegetation community impacts for Alternative 1 are shown on Figures 9-2a and 9-2b. Vegetation community impacts for all Project alternatives are listed in Table 9-6. To assess construction-related direct and indirect effects, the study area includes the area of temporary and permanent impacts plus a 100-foot buffer. To assess operations effects from an increase in the frequency and duration of inundation, the study area includes the entirety of the Yolo Bypass.

Areas within the permanent construction footprint would be graded and converted to rock-lined channels or concrete structures associated with the headworks. Areas within the temporary construction footprint would be graded and used during construction for vehicle access, spoils storage, and other construction activities and might be available for revegetation following construction.

During operations of Alternative 1, vegetation could establish within the rock-lined channels. The Lead Agencies anticipate that smaller plants, such as grasses and herbaceous plants, which do not impede fish passage, might be left in place. However, larger, woodier vegetation, such as shrubs and trees, would be removed from the channels only if it is determined that such vegetation is impeding fish passage and would be disposed of at an approved offsite landfill during maintenance.

During operations, Alternative 1 generally would result in an overall increased number of wet days within the Yolo Bypass of one week (with localized areas in the east experiencing an increased average number of wet days of up to three weeks and some areas in the west experiencing no change). Inundation data were obtained from Appendix H5 and Figures 13-4 through 13-6 in Chapter 13, *Recreation*, and Figure 11-5 in Chapter 11, *Land Use and Agriculture*). Areas in the western and northwestern portions of the FWWA would experience a reduction in the number of wet days. In general, areas in the eastern part of the Yolo Bypass would experience a greater increase in the number of wet days than the western part of the Yolo Bypass where some areas would see no effect. Within the Tule Ranch Unit of the YBWA, which provides habitat for special-status vernal pool plants and vernal pool crustaceans, there would be no change to up to one additional week of wet days in the western part of Tule Ranch to one to two additional weeks of wet days in the eastern part of Tule Ranch (see Figure 13-6 in Chapter 13, *Recreation*). Impacts to vernal pool plants resulting from operations are discussed under Impact-TERR-1. The increased inundation within Tule Ranch is not expected to result in substantial impacts on vernal pool crustaceans because this inundation would occur during the rainy season when the fairy shrimp hatch and would not interfere with the formation of cysts at

the end of the rainy season. Therefore, vernal pool crustaceans are not discussed further for this alternative.

9.3.3.2.1 Impact TERR-1: Potential Mortality or Loss of Habitat for Special-Status Plant Species

The construction study area for Alternative 1 provides suitable habitat (marsh and riparian areas) for seven special-status plant species, all considered rare, threatened, or endangered by CNPS, but none are State or Federally listed. These special-status plant species include woolly rose-mallow, northern California black walnut, bristly sedge, Peruvian dodder, Delta tule pea, Sanford's arrowhead, and Suisun Marsh aster. Construction of Alternative 1 would result in direct adverse effects on suitable habitat for the following special-status plant species known to occur in FWWA: woolly rose-mallow (associated with freshwater marsh and levees) and northern California black walnut (associated with riparian areas). The woolly rose-mallow plant identified during 2015 surveys near Agricultural Road Crossing 1 might be directly impacted by construction during site-grading activities. The other woolly rose-mallow plants and northern California black walnut tree would not be directly impacted because they are outside the construction area for this alternative.

Indirect effects on woolly rose-mallow could result from dewatering, sedimentation, generation of dust, accidental leaks or spills of fuel or oil, the accidental introduction of invasive plant species carried as seeds on construction equipment or personnel, or the spread of invasive plant species through soil disturbance (which tends to promote growth of non-natives). Invasive plant species can outcompete native plant species and reduce habitat complexity and quality for both special-status plant and wildlife species. Invasive plant species are already present in the Project area. However, construction activities could introduce new invasive plant species to the Project area.

The Lead Agencies do not expect construction activities in wet or ponded portions of the Project area (including freshwater marsh) or in grassland portions of the Project area (including seeps within grasslands) for Alternative 1 to adversely affect any other special-status plant species because none of the other species were observed during field surveys.

Alternative 1 would have the lowest construction impacts to suitable and occupied habitat for special-status plant species of all the proposed alternatives.

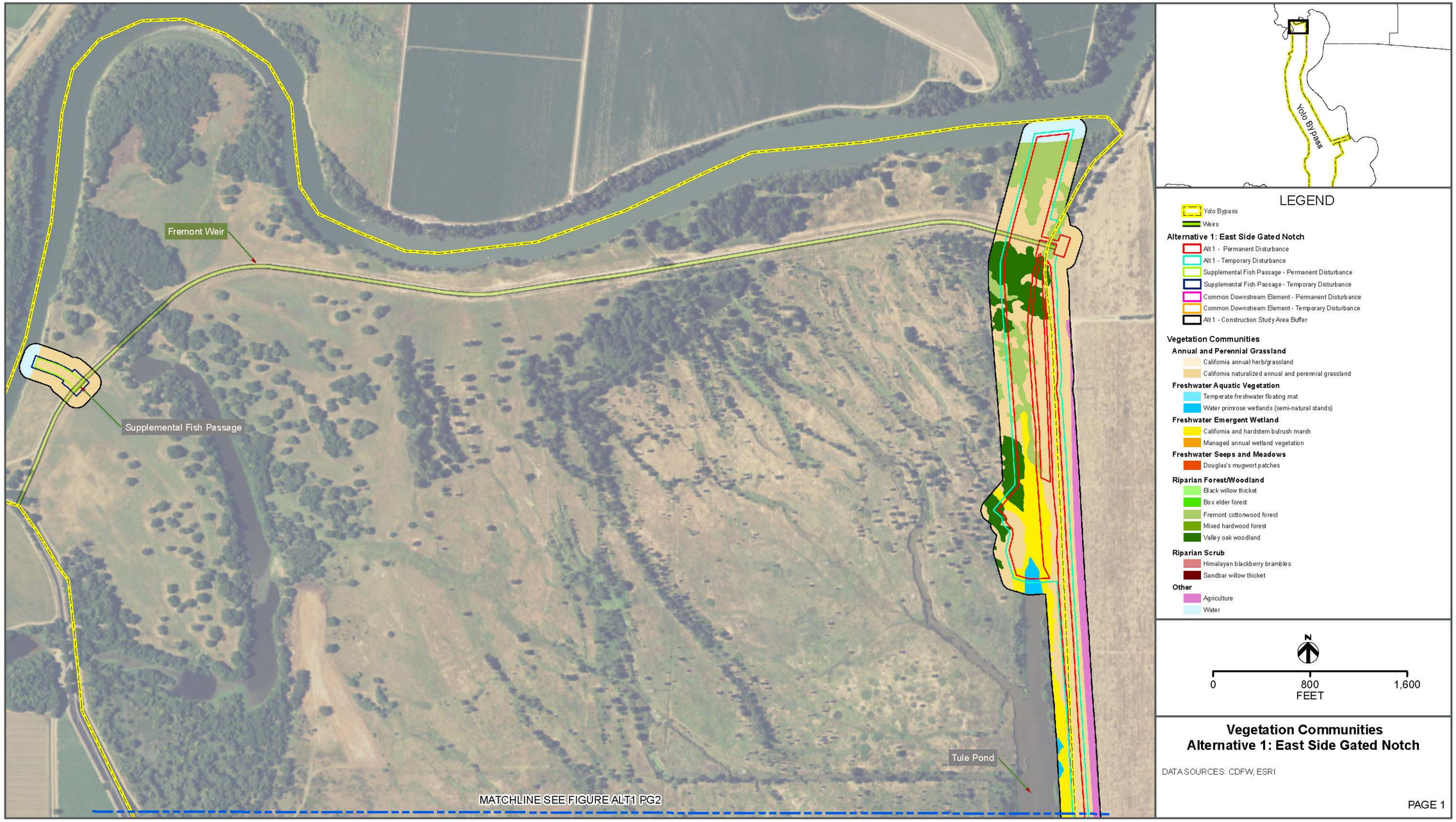

Figure 9-2a. Alternative 1 Construction Impacts to Vegetation Communities

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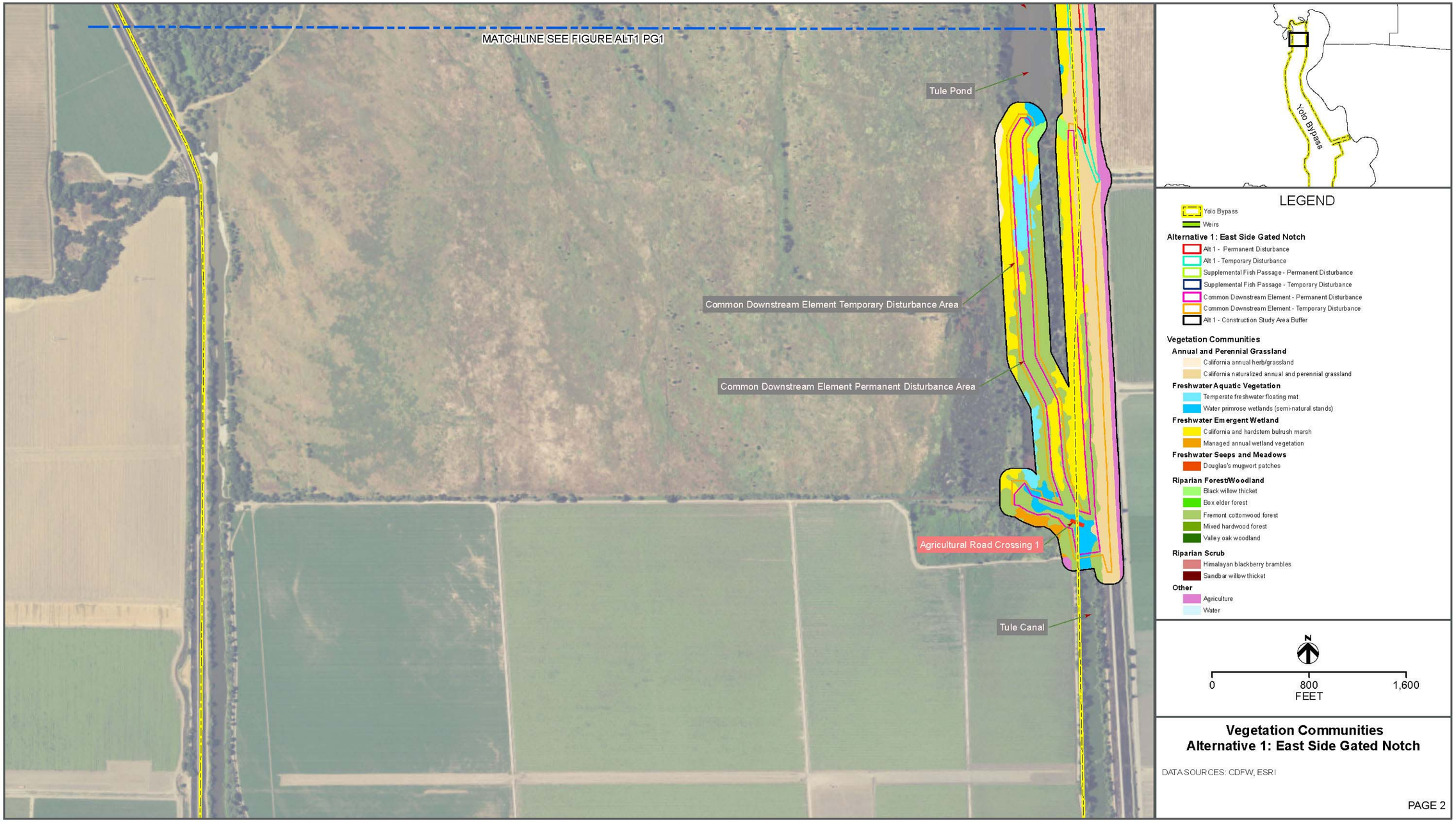

Figure 9-2b. Alternative 1 Construction Impacts to Vegetation Communities

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Table 9-6. Construction Impacts to Vegetation Communities and Cover Types by Alternative

Vegetation Community	Alt. 1 Temp. (acres)	Alt. 1 Perm. (acres)	Alt. 2 Temp. (acres)	Alt. 2 Perm. (acres)	Alt. 3 Temp. (acres)	Alt. 3 Perm. (acres)	Alt. 4 Temp. (acres)	Alt. 4 Perm. (acres)	Alt. 5 Temp. (acres)	Alt. 5 Perm. (acres)	Alt. 6 Temp. (acres)	Alt. 6 Perm. (acres)
Annual and Perennial Grassland	**17.9**	**19.3**	**20.8**	**49.3**	**19.6**	**42.8**	**64.4**	**65.7**	**20.0**	**71.6**	**20.6**	**60.2**
California annual herb/grassland	0.0	0.0	4.9	14.1	5.7	15.8	5.7	15.8	8.5	29.6	6.0	32.5
California naturalized annual and perennial grassland	17.9	19.3	15.9	35.2	13.9	27.0	58.7	49.9	11.5	42.0	14.6	27.7
Freshwater Aquatic Vegetation	**0.9**	**3.1**	**1.0**	**4.0**	**1.0**	**4.0**	**1.2**	**4.0**	**0.1**	**2.6**	**1.0**	**4.3**
Temperate freshwater floating mat	0.5	1.3	0.5	1.3	0.5	1.3	0.5	1.3	0.1	0.9	0.5	1.3
Water primrose wetlands (semi-natural stands)	0.4	1.8	0.5	2.7	0.5	2.7	0.7	2.7	0.0	1.7	0.5	3.0
Freshwater Emergent Marsh	**3.0**	**8.7**	**1.6**	**9.3**	**2.2**	**10.0**	**25.9**	**24.2**	**0.5**	**4.9**	**2.0**	**10.5**
California and hardstem bulrush marsh	3.0	8.7	1.6	9.3	1.6	9.2	1.6	9.3	0.5	4.9	1.6	9.5
Managed annual wetland vegetation	<0.001	0.0	<0.001	0.0	0.6	0.8	24.3	14.9	0.0	<0.001	0.4	1.0
Marsh/Seep	**0.0**	**0.0**	**0.0**	**0.0**	**0.9**	**4.0**	**0.9**	**4.0**	**0.0**	**0.0**	**0.6**	**5.4**
Douglas' mugwort patches	0.0	0.0	0.0	0.0	0.9	4.0	0.9	4.0	0.0	0.0	0.6	5.4
Riparian Forest/Woodland	**7.1**	**16.0**	**6.0**	**16.5**	**8.8**	**20.1**	**20.6**	**24.7**	**7.2**	**11.9**	**8.1**	**26.8**
Black willow thicket	<0.1	<0.1	<0.1	0.1	<0.1	0.1	4.2	0.9	0.1	1.4	<0.1	0.1
Box elder forest	0.0	0.0	0.0	0.0	0.2	0.6	0.1	0.6	0.0	0.0	0.1	1.3
Fremont cottonwood forest	5.7	12.0	5.4	11.8	7.0	14.3	14.3	17.9	6.6	8.8	6.7	18.9
Mixed hardwood forest	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0

Vegetation Community	Alt. 1 Temp. (acres)	Alt. 1 Perm. (acres)	Alt. 2 Temp. (acres)	Alt. 2 Perm. (acres)	Alt. 3 Temp. (acres)	Alt. 3 Perm. (acres)	Alt. 4 Temp. (acres)	Alt. 4 Perm. (acres)	Alt. 5 Temp. (acres)	Alt. 5 Perm. (acres)	Alt. 6 Temp. (acres)	Alt. 6 Perm. (acres)
Valley oak woodland	1.4	4.0	0.6	4.6	1.6	5.1	1.6	5.1	0.5	1.7	1.2	6.5
Riparian Scrub	**0.0**	**0.0**	**0.1**	**0.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.3**	**0.0**	**0.0**
Himalayan blackberry brambles	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0
Other	**0.3**	**0.4**	**1.5**	**5.8**	**0.8**	**0.8**	**25.8**	**23.4**	**<0.1**	**5.0**	**1.5**	**1.5**
Agriculture	<0.01	0.0	0.0	<0.01	0.0	<0.1	17.9	20.5	0.0	0.0	0.1	<0.1
Open water	0.3	0.4	1.5	5.8	0.8	0.8	7.9	2.9	<0.1	5.0	1.4	1.4
Total	**29.2**	**47.5**	**31.0**	**85.2**	**33.3**	**81.7**	**138.8**	**146.0**	**27.9**	**96.3**	**33.8**	**108.7**

Key: Perm. = permanent impacts; Temp. = temporary impacts.

The Lead Agencies do not anticipate operations under Alternative 1 to result in substantial mortality or loss of habitat for special-status plant species mentioned above or those known to occur or with the potential to occur within other areas of the Yolo Bypass (including Baker's navarretia, bearded popcornflower, Ferris' milkvetch, Heckard's pepper grass, hogwallow starfish, Jepson's coyote-thistle, legenere, little mousetail, Boggs Lake hedge-hyssop, California alkali grass, colusa grass, dwarf downingia, Parry's rough tarplant, Solano grass, vernal pool smallscale, Wright's trichocoronis, and San Joaquin spearscale). The small expected increase in the average number of wet days under Alternative 1 is not expected to result in significant operations impacts to special-status plant species, which are tolerant of moist soils and have evolved in an area that is subject to regular inundation. Similarly, operations activities are not expected to result in a dramatic change in the abundance of invasive plant species.

Routine maintenance of the new intake channel, headworks, transport channel, outtake channel, and west supplemental fish passage facility could require the removal of woody vegetation and sediment that has built up within the channels if a qualified biologist determines that such vegetation and sediment is detrimental to fish passage. However, except for woolly rose-mallow, Delta tule pea, and Suisun Marsh aster, the Lead Agencies do not expect special-status plant species to colonize this rock-lined environment. Woolly rose-mallow, Delta tule pea, and Suisun Marsh aster, all non-woody, herbaceous plants, are not expected to reduce water flow like woody vegetation might, so these plants would not be subject to removal. Vegetation removal conducted as part of routine maintenance that does not consider proper control methods for invasive plant species that may colonize the channel environment may inadvertently encourage the spread of such species.

Woolly rose-mallow is the only special-status plant species known to occur in and near the study area for Alternative 1. One individual woolly rose-mallow plant at Agricultural Road Crossing 1 could be impacted out of five observed during surveys in 2014 and 2015. There is suitable habitat for six other special-status plant species in the study area for Alternative 1. However, these species were not observed during plant surveys conducted in areas of suitable habitat during these species' flowering periods.

CEQA Conclusion

Construction and maintenance of Alternative 1 could result in a **significant** impact on special-status plant species or their habitat through the introduction or spread of invasive plant species. Under operations, impacts would be **less than significant** because the Project is not anticipated to result in substantial mortality or loss of habitat for special-status plant species, which are tolerant of moist soils and have evolved in an area that is subject to regular inundation.

Mitigation Measure MM-TERR-1: Implement BMPs for the Management of Invasive Plants

The Project biologist shall monitor the Project site immediately prior to and during construction to identify the presence of invasive plants (those identified by Cal-IPC as having a moderate or high level of invasiveness or plants considered locally invasive) and recommend measures to avoid their inadvertent spread in association with construction and maintenance. The Project biologist shall prepare an invasive plant management plan subject to USFWS and CDFW review and approval based on the results of this field survey. The contractor shall be responsible for implementing the recommendations in the management plan. In addition, the contractor shall

implement the following BMPs to prevent the introduction and spread of invasive plant species during construction and maintenance:

- All construction and maintenance equipment shall be washed and cleaned of debris prior to entering the Project area to prevent entry of new invasive plant species to the Project area.
- Straw bales and other vegetative materials used for erosion control shall be certified weed-free.
- All revegetation materials (e.g., seed mixes and mulches) shall consist of native plant species from the Yolo Bypass, certified weed-free, and all seeds and container plants shall be obtained from locally adapted genetic stock that is also free from fungal pathogens (*Phytopthora* spp.)
- In areas requiring weed control, effective methods for removal may vary depending on the species that is being controlled (typical methods include hand removal, mowing, or herbicide application). Herbicides shall be used consistent with Federal, State, and local requirements (including requirements or restrictions on the use of herbicides that are specified by resource agencies to prevent impacts to aquatic habitats, listed plant or wildlife species, or their habitat). All herbicides shall be used under the advisement of a certified Pesticide Control Advisor and shall be applied by an operator with a Qualified Applicator's License.
- Insecticides, herbicides, fertilizers, and other chemicals that could harm special-status plant species or plants that provide habitat for special-status wildlife species shall not be used within 100 feet of such species and shall not be used without prior approval from USFWS and/or CDFW.
- Affected areas shall be replanted with CDFW-approved native vegetation.

Implementation of Mitigation Measure MM-TERR-1 would reduce construction and maintenance impacts on special-status plant species and their suitable habitat to **less than significant**.

9.3.3.2.2 Impact TERR-2: Potential Disturbance or Mortality of Valley Elderberry Longhorn Beetle and Loss of Its Habitat (Elderberry Shrubs)

Based on 2014 surveys, the construction disturbance area for Alternative 1, including construction, staging, and spoils areas, does not contain any elderberry shrubs, which are the host plant for the valley elderberry longhorn beetle (Table 9-7). The elderberry shrub mapped during 2014 surveys that is closest to Alternative 1 is in riparian habitat approximately 660 feet from the supplemental fish passage structure. The fish passage structure itself would occupy an area consisting entirely of non-riparian habitat (California naturalized annual and perennial grassland and open water; see Figures 9-1 and 9-2a).

However, elderberry shrubs could have grown in the construction disturbance area since 2014 or could grow in that area prior to construction. If elderberry shrubs are found during pre-construction surveys, construction of Alternative 1 could result in direct effects on the valley elderberry longhorn beetle through removal of its host plant and surrounding habitat; however, impacts cannot be quantified at this time. In addition, construction of Alternative 1 could result in indirect effects on this species if construction activities indirectly affect elderberry shrubs such as from construction-generated dust, root damage, or soil compaction.

Table 9-7. Potential Construction Impacts to Known Suitable Valley Elderberry Longhorn Beetle Habitat by Alternative

Alternative	Temporary Impact (acres)	Permanent Impact (acres)	Total Impact (acres)
Alternative 1[1]	0.0	0.0	**0.0**
Alternative 2[2]	0.0	0.0	**0.0**
Alternative 3	1.3	1.8	**3.1**
Alternative 4	1.3	1.8	**3.1**
Alternative 5[2]	0.0	0.0	**0.0**
Alternative 6	1.2	2.7	**3.9**

[1] Impacts shown reflect known elderberry shrub occurrences based on 2014 surveys plus a 165-foot buffer surrounding each shrub.

[2] Impacts of Alternatives 2 and 5 cannot be quantified at this time because surveys did not include the entirety of the study area for these alternatives.

Ongoing maintenance activities could result in the removal of elderberry shrubs from the channels. Any constructed channels would require clearing of elderberry shrubs during the construction period, and any new elderberry shrubs that are not removed during maintenance activities before they reach the size of one inch in diameter at ground level (i.e., before they provide suitable habitat for valley elderberry longhorn beetle) could be removed during maintenance. Such maintenance-related effects on valley elderberry longhorn beetle would be considered significant.

The Lead Agencies do not expect operations to result in substantial adverse effects on valley elderberry longhorn beetle or its elderberry host plant because the limited increase in the average number of wet days under Alternative 1 is not likely to lead to a type conversion of habitat that would prevent the reproduction and growth of elderberry shrubs.

CEQA Conclusion

If elderberry shrubs are found during pre-construction surveys, potential disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat would be **significant**. Maintenance impacts would be **significant** if elderberry shrubs that become established in the channels are not removed before they provide habitat for valley elderberry longhorn beetle. Operations impacts would be **less than significant** because the limited increase in the average number of wet days under Alternative 1 is not likely to lead to a type conversion of habitat that would prevent reproduction and growth of elderberry shrubs.

Mitigation Measure MM-TERR-2: Designate a Project Biologist

Prior to the commencement of construction or ongoing maintenance activities, the Lead Agencies shall designate a USFWS- and CDFW-approved Project biologist (a person with, at minimum, a bachelor's degree in biology, ecology, or environmental studies with familiarity with particular species with the potential to be impacted by the Project, including valley elderberry longhorn beetle, giant garter snake, western pond turtle, Swainson's Hawk, Least Bell's Vireo, Western Yellow-Billed Cuckoo, and Bank Swallow) who shall be responsible for overseeing compliance with protective measures for terrestrial biological resources during

clearing and work activities within and adjacent to areas of sensitive vegetation communities. The Project biologist shall be familiar with the local vegetation communities, plants, and wildlife and shall maintain communications with the contractor to ensure that issues relating to biological resources are appropriately and lawfully managed. The Project biologist may designate USFWS- and CDFW-approved, qualified biologists or biological monitors to help oversee Project compliance or conduct focused surveys for special-status species. These biologists shall have familiarity with the species for which they would be conducting focused surveys or monitoring construction activities.

The Project biologist or qualified biologist shall review final plans, designate areas that need temporary fencing, and monitor construction activities within and adjacent to areas with native vegetation communities or special-status plant and animal species. The qualified biologist shall monitor activities within designated areas during critical times, such as vegetation removal, initial ground-disturbing activities, and the installation of BMPs and fencing to protect native species, and shall ensure that all avoidance and minimization measures are properly constructed and followed. The qualified biologist shall check construction barriers or exclusion fencing and shall provide corrective measures to the contractor to ensure the barriers or fencing are maintained throughout construction. The qualified biologist shall have the authority to stop work if a special-status wildlife species is encountered within the Project area during construction. Construction activities shall cease until the Project or qualified biologist determine(s) that the animal will not be harmed or that it has left the construction area on its own. The appropriate regulatory agency(ies) shall be notified within 24 hours of sighting of a special-status wildlife species. The Project or qualified biologist shall conduct pre-maintenance surveys as needed in sensitive habitat areas or areas that could support special-status plant or animal species.

Mitigation Measure MM-TERR-3: Implement a Worker Environmental Awareness Program

Prior to the start of construction, all Project personnel and contractors who will be on site during construction shall complete mandatory worker environmental awareness program training conducted by the Project biologist or a designated qualified biologist. The training shall advise workers of potential impacts to sensitive vegetation communities and special-status plant and wildlife species and the potential penalties for impacts to such habitat and species. At a minimum, the program shall include the following topics: occurrences of the special-status species and sensitive vegetation communities in the Project area (including communities subject to USACE and CDFW jurisdiction), a physical description, life history, habitat requirements, sensitivity to human activities, legal protection and penalties for violations of Federal and State laws, reporting requirements, work features designed to reduce the impacts, and general plant- and wildlife-protection measures. Construction personnel shall be informed of the procedures to follow should a Federally or State-listed species be encountered during construction. Special-status species that should be covered in the training include valley elderberry longhorn beetle, giant garter snake, western pond turtle, special-status birds (Tricolored Blackbird, Bank Swallow, Swainson's Hawk, Least Bell's Vireo, Western Yellow-billed Cuckoo), migratory birds, special status bats, and American badger. Sensitive vegetation communities that should be covered in the training include black willow thickets, box elder forest, California and hardstem bulrush marsh, Fremont cottonwood forest, mixed hardwood forest, sandbar willow thickets, and valley oak woodland.

Included in this program shall be color photos of the special-status species and sensitive vegetation communities, which shall be shown to project personnel. Following the education program, the photos shall be posted in the contractor and resident engineer's office, where the photos shall remain through the duration of construction work. Photos of the habitat in which special-status species are found shall also be posted on site. The contractor shall be required to provide the Lead Agencies with evidence of the employee training (e.g., a sign-in sheet) on request. Project personnel and contractors shall be instructed to immediately notify the Project biologist or designated biologist of any incidents that could affect sensitive vegetation communities or special-status species. Incidents could include fuel leaks or injury to any wildlife. The Project biologist shall be responsible for notifying the appropriate regulatory agency within 72 hours of any similar incident.

Mitigation Measure MM-TERR-4: Implement General Wildlife Protection Measures

The construction contractor and maintenance personnel shall implement the following general wildlife-protection measures during construction and maintenance:

- Limit construction and maintenance activities to daylight hours to the extent feasible. If nighttime activities are unavoidable, then workers shall direct all lights for nighttime lighting into the work area and shall minimize the lighting of natural habitat areas adjacent to the work area. Light glare shields shall be used to reduce the extent of illumination into sensitive habitats. If the work area is located near surface waters, the lighting shall be shielded such that it does not shine directly into the water.
- Confine clearing to the minimal area necessary to facilitate construction and maintenance activities. Dispose of cleared vegetation and spoils daily at a permanent offsite spoils location or at a temporary onsite location that will not create habitat for special-status wildlife species. Spoils and dredged material shall be disposed of at an approved site or facility in accordance with all applicable Federal, State, and local regulations.
- Maintain equipment to comply with noise standards (e.g., exhaust mufflers, acoustically attenuating shields, shrouds, or enclosures).
- Avoid wildlife entrapment by completely covering or providing escape ramps for all excavated steep-walled holes or trenches more than 1 foot deep at the end of each construction work day. The qualified biologist shall inspect open trenches and holes and shall remove or release any trapped wildlife found in the trenches or holes prior to filling by the construction and maintenance contractors.
- Special-status wildlife can be attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar features; construction equipment; or construction debris left overnight in areas that may be occupied by special-status species that could occupy such structures shall be inspected by a qualified biologist prior to being used for construction. Such inspections shall occur at the beginning of each day's activities for those materials to be used or moved that day. If necessary, and under the direct supervision of the biologist, the structure may be moved up to one time to isolate it from construction activities, until the special-status species has moved from the structure of their own volition, has been captured and relocated, or has otherwise been removed from the structure.

- Capture and relocation of trapped or injured wildlife can only be performed by personnel with appropriate USFWS and CDFW handling permits. Any sightings and any incidental take shall be reported to CDFW and USFWS via email within one working day of the discovery. A follow-up report shall be sent to these agencies, including dates, locations, habitat description, and any corrective measures taken to protect special-status species encountered. For each special-status species encountered, the biologist shall submit a completed CNDDB field survey form (or equivalent) to CDFW no more than 90 days after completing the last field visit to the project site.
- CDFW and/or USFWS shall be notified within one working day of the discovery of, injury to, or mortality of a special-status species that results from project-related construction activities or is observed at the project site. Notification shall include the date, time, and location of the incident or of the discovery of an individual special-status species that is dead or injured. For a special-status species that is injured, general information on the type or extent of injury shall be included. The location of the incident shall be clearly indicated on a USGS 7.5-minute quadrangle and/or similar map at a scale that will allow others to find the location in the field, or as requested by CDFW and/or USFWS. The biologist is encouraged to include any other pertinent information in the notification.
- Minimize the spread of dust from work sites to sensitive natural communities or sensitive species habitats on adjacent lands by use of a water truck.
- Prior to the start of construction and maintenance activities each day, the Project biologist or designated biologist shall inspect the work area and any equipment or material left on site overnight for special-status wildlife species.
- Observe posted speed limit signs on local roads and observe a 15-mile-per-hour speed limit along ingress and egress routes. Extra caution shall be used on cool days when giant garter snakes may be basking on roads.
- Dispose of food-related and other garbage in wildlife-proof containers and remove the garbage from the project area daily during the construction and maintenance periods. Vehicles carrying trash will be required to have loads covered and secured to prevent trash and debris from falling onto roads and adjacent properties.
- To avoid injury or death to wildlife, no firearms will be allowed on the project site except for those carried by authorized security personnel or local, State, or Federal law enforcement officials.
- To prevent harassment, injury, or mortality of sensitive wildlife by dogs or cats, no canine or feline pets will be permitted in the active construction area.
- Plastic monofilament netting or similar material will not be used for erosion control because smaller wildlife may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackifier hydroseeding compounds. This limitation shall be communicated to the contractor through specifications or special provisions included in the construction bid solicitation package.
- Rodenticides and herbicides shall be used in accordance with the manufacturer recommended uses and applications and in such a manner as to prevent primary or secondary poisoning of special-status fish, wildlife, and plant species and depletion of prey populations upon which

they depend. All uses of such compounds shall observe label and other restrictions mandated by the USEPA), the California Department of Pesticide Regulation, and other appropriate State and Federal regulations, as well as additional project-related restrictions imposed by USFWS and/or CDFW.

- Retain a qualified biologist to be present or on call during construction and maintenance activities with the potential to affect sensitive biological resources. The qualified biologist shall conduct monitoring per MM-TERR-2.

Mitigation Measure MM-TERR-5: Establish Project Limits

All native or sensitive habitat areas outside of and adjacent to the designated Project limits of disturbance shall be designated as Environmentally Sensitive Areas on Project maps. Prior to construction, the Lead Agencies shall delineate the Project limits, including construction, staging, lay-down, and equipment storage areas, and erect the construction boundary, with fencing or flagging, along the perimeter of the identified construction area to protect adjacent sensitive habitats and sensitive plant populations. Environmentally Sensitive Areas shall be clearly delineated with fencing or flagging or other BMPs prior to construction to inform construction personnel where the Environmentally Sensitive Areas are located. The fences and flags shall be marked clearly in the field and confirmed by the Project biologist prior to any clearing, and the marked boundaries shall be maintained throughout the duration of construction work. No personnel, equipment, or debris shall be allowed within the Environmentally Sensitive Areas. Fences and flags shall be installed by the contractor in a manner that does not impact habitats to be avoided and such that it is clearly visible to personnel on foot and operating heavy equipment. Ten days prior to initiating construction, the contractor shall submit to Lead Agencies final plans for initial clearing and grubbing of habitat and Project construction. Temporary construction fences and markers shall be maintained in good repair by the contractor and shall be removed upon completion of Project construction.

No work activities, materials, or equipment storage or access shall be permitted outside the Project limits without permission from the regulatory agencies. All parking and equipment storage by the contractor related to the Project shall be confined to the Project limits. Undisturbed areas and sensitive habitat outside and adjacent to the Project limits shall not be used for parking or equipment storage. Project-related vehicle traffic shall be restricted to the Project limits and established roads and construction access points.

Mitigation Measure MM-TERR-6: Designate Construction Staging and Vehicle Use Requirements

All construction-related vehicles and equipment storage shall occur in the designated staging areas. These areas shall not contain native or sensitive vegetation communities and shall not support sensitive plant or wildlife species. Project-related vehicle traffic shall be restricted to established roads and the Project disturbance limits as described above and all motor vehicles operating within the Project limits shall observe a speed limit of 15 miles per hour to avoid striking giant garter snake or other special-status wildlife species. Dirt access roads, haul roads, and spoils areas shall be watered at least twice each day when being used during construction dry periods.

Mitigation Measure MM-TERR-7: Conduct Valley Elderberry Longhorn Beetle Habitat Surveys Prior to Construction and Maintenance

Prior to the start of construction activities, valley elderberry longhorn beetle habitat surveys shall be conducted by a qualified biologist that has been approved by the USFWS in the Project construction area and within 165 feet of the Project construction area. All elderberry shrubs with stems one inch or greater in diameter at ground level shall be recorded, tallied by diameter size class, and designated as to whether the elderberry shrub is in a riparian or non-riparian area. Exit hole surveys are not essential in riparian areas but shall be conducted in non-riparian areas. Elderberry shrubs shall be marked with flags for avoidance during construction, if feasible.

Prior to conducting maintenance activities, a qualified biologist shall determine if any elderberry shrubs that are one inch or greater at ground level are present within the maintenance area. If elderberry shrubs smaller than that size are present, they shall be removed or transplanted to an approved off-site mitigation area. If elderberry shrubs one-inch or greater at ground level are present, then DWR/Bureau of Reclamation shall consult with USFWS in accordance with MM-TERR-9 and MM-TERR-10.

Mitigation Measure MM-TERR-8: Establish and Maintain a Buffer Zone for Elderberry Shrubs

Elderberry shrubs mapped during pre-construction surveys shall be avoided to the extent practicable during construction activities. For all elderberry shrubs identified for avoidance, an avoidance buffer of 165 feet or more shall be established prior to construction activities. The avoidance buffer shall consist of a physical barrier, such as flags, exclusion fences, or K-Rail barriers, and shall be maintained for the duration of Project construction. The following protective measures shall be taken to ensure that elderberry shrubs in the buffer zone are not impacted:

- Prior to construction, all buffer areas surrounding elderberry shrubs to be avoided shall be fenced and/or flagged as close to the construction limits as feasible. In areas where encroachment of the 165-foot buffer has been approved by USFWS, a minimum setback of at least 20 feet from the drip-line of each elderberry shrub shall be provided to avoid damaging or killing the plant. A 20-foot avoidance buffer shall be established around all elderberry shrubs with stems one inch or greater in diameter at ground level during maintenance. These areas shall be avoided by all maintenance personnel and maintenance activities. Mowing shall not occur within five feet of any elderberry stem one inch or greater in diameter at ground level. Vegetation within five feet of any elderberry stem one inch or greater in diameter at ground level shall be removed by hand only.
- The contractor and all Project personnel and contractors that will be on site during construction shall be briefed regarding the status of the beetle and the need to protect its elderberry host plant, the need to avoid damaging elderberry shrubs and possible penalties for noncompliance with these requirements.
- To the extent feasible, all activities within 165 feet of an elderberry shrub shall be conducted outside of the valley elderberry longhorn beetle flight season (March-July).
- Signs shall be erected every 50 feet along the edge of the avoidance area with the following information: “This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act

of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs shall be clearly readable from 20 feet and must be maintained for the duration of Project construction.

- If there is damage within the 165-foot buffer areas, erosion control measures and revegetation with appropriate native plant species shall be conducted with approval from USFWS.
- No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its elderberry host plant shall be used in the 165-foot buffer areas.
- DWR/Reclamation shall provide a written description to USFWS regarding how the buffer areas are to be restored, protected, and maintained after construction is completed.

Mitigation Measure MM-TERR-9: Consult with USFWS Prior to Any Ground Disturbance within 165 Feet of Elderberry Shrubs

DWR/Reclamation shall consult with USFWS prior to any ground disturbance within 165 feet of an elderberry shrub. In areas where encroachment into the 165-foot buffer zone is necessary, a minimum setback of at least 20 feet from the drip-line of the elderberry shrub shall be established per MM-TERR-8. DWR/Reclamation shall provide USFWS with a map identifying the avoidance area and a list of proposed avoidance measures.

Mitigation Measure MM-TERR-10: Mitigate for Elderberry Shrubs That Cannot Be Avoided

DWR/Reclamation shall identify measures to relocate (transplant) or replace elderberry shrubs with stems measuring one inch or greater in diameter at ground level if an adequate buffer cannot be provided, if trimming is required, if a shrub cannot be avoided during construction and must be removed, or if indirect effects will result in the death of stems or the entire shrub. DWR/Reclamation shall prepare a mitigation plan subject to USFWS approval for impacts to elderberry shrubs. This plan shall include transplantation procedures that comply with USFWS's *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (*Desmocerus californicus dimorphus*) (USFWS 2017). These procedures include requirements for a qualified biologist to perform exit-hole surveys prior to transplanting and to monitor elderberry shrub transplantation, information on timing of transplantation during the non-growing season (approximately November through mid-February), the need for compliance with the most current version of the American National Standards Institute A300 (Part 6) guidelines for transplanting (http://www.tcia.org/), and specific methods to follow during transplantation, including how far to cut back stems, how large a hole to excavate, and proper planting and watering techniques to minimize stress and maximize transplantation survival.

For unavoidable adverse impacts to valley elderberry longhorn beetle or its habitat, compensatory mitigation will be coordinated with USFWS. General guidelines require transplanting elderberry shrubs to designated mitigation areas at a mitigation ratio determined during consultation with USFWS (typically a minimum of 3:1 for acres of suitable riparian habitat that would be permanently impacted and a minimum of 1:1 for acres of occupied elderberry shrubs in non-riparian habitat). In addition, two credits at a USFWS-approved bank shall be purchased for each impacted shrub in riparian areas, and one credit shall be purchased for each impacted shrub in non-riparian areas. Associated native plant species might need to be

planted to provide a more diverse native vegetation community at a mitigation ratio determined during consultation with USFWS. Planted and seeded areas might be subject to monitoring and performance standards. Alternatively, mitigation credits might be purchased from an approved mitigation bank. The mitigation plan must be approved by USFWS during formal consultation and could include, but would not necessarily be limited to, identified locations for transplanted or replacement elderberry shrubs, appropriate replacement ratios, and success standards, monitoring, and reporting requirements (per USFWS 2017 guidelines). Consultation with USFWS shall be completed prior to removal, trimming, or thinning of any elderberry shrubs.

Mitigation Measure MM-TERR-11: Prepare and Implement a Compensatory Restoration Plan for Sensitive Vegetation Communities

Impacts to sensitive vegetation communities shall be mitigated through the establishment, enhancement, or preservation of habitat either in the FWWA or in the Yolo Bypass at a minimum 1:1 ratio based on either acreage or habitat function (riparian communities will be mitigated at a 3:1 ratio). Sensitive vegetation communities include habitats with potential to support Federally and/or State threatened or endangered species, USACE wetlands, and CDFW riparian areas (open water, temperate freshwater floating mat, water primrose wetlands, California and hardstem bulrush marsh, black willow thickets, box elder forest, Fremont cottonwood forest, mixed hardwood forest, and valley oak woodland). Final mitigation ratios will be determined in consultation with each relevant regulatory agency. USACE wetland habitat and valley oak woodland will require a minimum of 1:1 establishment or substantial restoration to comply with Federal wetland policy and local oak woodland policy. Establishment and enhancement will be provided on site where feasible. If sufficient suitable area is not available near the Project impact area, then offsite mitigation options will be pursued. Offsite options may include county, CDFW, USFWS, and/or USACE-approved in-lieu fee payments or purchase of mitigation credits at a USACE- and CDFW-approved mitigation bank, as applicable.
A restoration plan shall be prepared for mitigation and onsite restoration of temporary impacts. These plans will detail the communities to be restored, locations for restoration, container plant palettes and/or seed mixes, and maintenance and monitoring requirements. Seed mixes shall consist of plant species native to the Project area and shall be free from noxious weed species.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-11 would reduce construction and maintenance impacts to valley elderberry longhorn beetle and its habitat to **less than significant**.

9.3.3.2.3 Impact TERR-3: Potential Disturbance or Mortality of and Loss of Suitable Habitat for Giant Garter Snake

Construction of Alternative 1 would result in direct and indirect effects on suitable giant garter snake habitat (all suitable aquatic habitat and suitable upland habitat within 200 feet of aquatic habitat). Direct effects could occur through injury, mortality, or disturbance resulting from grading activities, vehicle strikes, or fuel or oil spills from construction equipment in aquatic areas (freshwater emergent aquatic and freshwater emergent marsh) associated with Tule Pond and Agricultural Road Crossing 1 as well as in adjacent upland habitat. Indirect effects could occur through noise and vibration from construction equipment or disturbance due to the presence of human activity.

Construction activities for Alternative 1 are proposed to occur over one season between April 15 and November 1. The active season for giant garter snakes is May 1 to October 1. Beginning construction during the dormant period would increase the risk of direct mortality, although construction during the two-week period (April 15 to May 1) will be restricted, to the extent feasible, to areas that are not within suitable habitat for giant garter snake, thereby minimizing the potential for impacts to this species. The potential for direct mortality during the active season is lower than during the dormant period because snakes are underground less and may be able to move to avoid danger. Although construction activities would extend past October 1 (the end of the active season), continuous construction throughout the active season likely would deter giant garter snakes from the Project area and, therefore, reduce the likelihood of them using the area during the dormant period (USFWS 1997). Extending the construction period to November 1 should allow the alternative to be completed in a single year, thereby reducing potential impacts that would result from multi-year construction.

Temporary construction effects on giant garter snake aquatic habitat would result from earth removal associated with grading and general activities in the temporary construction area along Tule Pond and at Agricultural Road Crossing 1, including removing the cross canal earthen berm, construction of a bridge at the existing Agricultural Road Crossing 1, and construction of a new berm to the west of the top of Tule Canal with an inverted siphon beneath the new Tule Canal connection. Construction of Alternative 1 would temporarily affect 3.9 acres of suitable giant garter snake aquatic habitat (Table 9-8). This assessment was based on temporary construction impacts to all freshwater emergent aquatic and freshwater emergent marsh habitat. A detailed assessment during final plan review would include review of these areas for suitability as giant garter snake habitat and a removal of those areas that are deemed to not be suitable from the impact assessment; the effects on giant garter snake aquatic habitat are, therefore, expected to be less than what is disclosed in Table 9-8.

Permanent construction effects on giant garter snake aquatic habitat would result from the placement of engineered streambed material (rock slope protection and riprap) along the outlet channel. This would permanently alter the substrate of 11.8 acres of giant garter snake aquatic habitat, which would substantially reduce the quality of habitat for use by giant garter snakes (USFWS 2016c).

Table 9-8. Potential Construction Impacts to Suitable Giant Garter Snake Aquatic and Upland Habitat by Alternative[1]

Alternative	Habitat	Temporary Impact (acres)	Permanent Impact (acres)	Total Impact (acres)
Alternative 1	Aquatic	3.9	11.8	**15.7**
	Upland	20.5	21.4	**41.9**
Alternative 2	Aquatic	2.6	13.3	**15.9**
	Upland	12.7	11.9	**24.6**
Alternative 3	Aquatic	3.2	14.1	**17.3**
	Upland	15.9	15.7	**31.6**
Alternative 4	Aquatic	44.9	47.4	**92.3**
	Upland	71.7	43.7	**115.4**

Alternative	Habitat	Temporary Impact (acres)	Permanent Impact (acres)	Total Impact (acres)
Alternative 5	Aquatic	0.6	7.5	**8.1**
	Upland	0.6	8.6	**9.2**
Alternative 6	Aquatic	3.0	12.3	**15.3**
	Upland	17.1	16.5	**33.6**

[1] The permanent acreages in this table include giant garter snake habitat impacted at Tule Pond but do not account for the partial draining of Tule Pond, which is considered a construction impact for all alternatives except Alternative 5.

Temporary construction effects on suitable giant garter snake upland habitat would result from construction activities associated with vegetation removal. Vegetation and soils that are removed will be transported daily either to a temporary spoils site outside of giant garter snake upland habitat or to a permanent spoils site to prevent the creation of potential giant garter snake habitat in spoils piles. Construction of Alternative 1 would result in temporary disturbance to 20.5 acres of giant garter snake upland habitat. Placing rounded rock revetment on the channel bottom and angular rock on the bank slopes of the transport channel and at Agricultural Road Crossing 1 would permanently alter the substrate of 21.4 acres of giant garter snake upland habitat. Non-woody grasses and herbaceous vegetation would be allowed to re-colonize the area, and the rock-lined banks areas would still provide limited habitat value such as basking sites and refugia during colder months or during extreme heat. Although the altered habitat would represent a small portion of available upland habitat in the alternative's vicinity and upland areas would continue to provide limited habitat value for giant garter snakes, Alternative 1 would result in a net reduction in habitat quality and suitability for giant garter snakes.

Construction of Alternative 1 would partially drain Tule Pond, reducing the amount of giant garter snake aquatic habitat associated with Tule Pond as well as adjacent upland habitat out to 200 feet. This would be considered a permanent reduction in the availability of suitable giant garter snake aquatic and upland habitat that would be consistent across all alternatives except Alternative 5 and would be subject to additional compensation or mitigation separate from the impacts shown in Table 9-8, although some of this area is already accounted for in Table 9-8 as construction impacts resulting from grading.

During operations, changes in the duration of inundation under Alternative 1 would occur during the giant garter snake inactive period (October 1 to May 1) when these animals would be dormant in upland burrows. Although inundation of some occupied burrows located below the elevation of the floodwaters may result in the loss of giant garter snake individuals, these losses are not anticipated to be substantially greater than would occur under existing conditions in an environment that is subject to annual flooding. Direct or indirect adverse effects on giant garter snakes resulting from operations would be considered less than significant.

It is anticipated that ongoing maintenance activities would include the removal of debris, vegetation, and sediment along the project channels and at Agricultural Road Crossing 1 to maintain fish passage. These activities would be conducted outside the flood season during the giant garter snake active season when snakes are better able to move out of harm's way and less subject to injury if present.

In summary, construction- and maintenance-related effects on giant garter snakes could result in the mortality or injury of individuals and a reduction in the quantity and quality of habitat available in the study area.

CEQA Conclusion

Direct or indirect impacts to giant garter snake resulting from construction and maintenance of Alternative 1 would be **significant** because these activities could result in the mortality or injury of individuals and a reduction in the quantity and quality of suitable giant garter snake habitat. Operations impacts would be **less than significant** because the limited increase in the average number of wet days under Alternative 1 is not likely to result in substantially greater mortality to giant garter snakes that are dormant in upland burrows than under existing conditions.

Mitigation Measure MM-TERR-12: Implement Giant Garter Snake Avoidance and Minimization Measures

The following measures shall be implemented to avoid or minimize impacts to giant garter snake and its aquatic and upland habitats:

- A qualified giant garter snake biologist approved by the USFWS and CDFW shall be present to monitor construction and maintenance activities in or within 200 feet of suitable giant garter snake aquatic or upland habitat. The qualified biologist shall be present during vegetation removal in giant garter snake habitat and shall walk ahead of the removal of emergent wetland and herbaceous upland vegetation.
- Disturbance to suitable aquatic and upland sites in or near the project footprint shall be avoided to the extent feasible, and the loss of aquatic habitat and grassland vegetation shall be minimized through adjustments to project design, as practicable.
- USFWS- and CDFW-approved biologists shall conduct pre-construction surveys in suitable giant garter snake habitat for a period of three days prior to the installation of all Stormwater Pollution and Prevention Plan BMPs, vegetation clearing within or adjacent to aquatic habitat, and the establishment of staging areas within 200 feet of aquatic habitat. Within the project footprint where burrows are present in upland habitat within 200 feet of suitable aquatic habitat, all burrows shall be avoided until a USFWS- and CDFW-approved biologist has conducted burrow monitoring for a period of three days and cleared the area. To the extent practicable, construction activities shall be avoided within 200 feet of the banks of giant garter snake aquatic habitat. Ground disturbance shall be confined to the minimal area necessary to facilitate construction activities. To the maximum extent feasible, movement of heavy equipment shall be confined to existing roads.
- To the extent practicable, all construction activity in suitable giant garter snake habitat shall be conducted during the giant garter snake active period (May 1 to October 1) to lessen the risk of direct mortality. Only construction or maintenance activities within 200 feet of suitable giant garter snake habitat that have started prior to October 1 shall continue outside the active season, with CDFW and USFWS approval. No new construction or maintenance work activities within 200 feet of suitable giant garter snake habitat shall be started after October 1.

- Prior to the start of construction activities and during the active period for giant garter snakes (beginning May 1), a USFWS- and CDFW-approved biologist shall determine where exclusion fencing will be installed to protect giant garter snake habitat adjacent to the defined project footprint and minimize the potential for giant garter snakes to enter the construction work area. The construction contractor shall install exclusion fences along the edges of construction areas that are within 200 feet of suitable giant garter snake aquatic habitat. Avoided habitat shall be designated as Environmentally Sensitive Areas on final construction plans. The exclusion fencing shall consist of a material that snakes cannot get through or become entangled in. The exclusion fence shall be buried at least six inches below ground to prevent animals from entering below the fence, with at least 20 inches exposed above ground. The fence shall be inspected daily prior to project activity for maintenance and shall remain in place throughout the construction period. Maintenance shall include removal of vegetation and debris material that can be used to traverse the fence, patching any holes within the fence, ensuring the fence is intact and upright, and filling new burrows that go under the fence once a qualified biologist has inspected such burrows to ensure no special-status wildlife species are occupying them. Any necessary repairs shall be immediately addressed. If work extends beyond October 1, the exclusion fencing shall be maintained to prevent giant garter snakes from entering the construction limits and utilizing upland areas for overwintering.
- If exclusion fencing is found to be compromised, a USFWS- and CDFW-approved biologist shall conduct a survey immediately preceding construction activity that occurs in designated giant garter snake habitat or in advance of any activity that may result in take of the species. The biologist shall search along exclusion fences and in pipes and beneath vehicles before they are moved.
- If a giant garter snake is observed in the construction area, all construction activities shall cease and a qualified biologist shall be notified immediately. If possible, the snake should be allowed to leave on its own and activities shall not resume until the snake has moved out of the area on its own. Alternatively, the qualified biologist may capture and relocate the snake unharmed to suitable aquatic habitat a minimum of 200 feet outside of the work area in a location that is identified by a USFWS- and CDFW-approved biologist prior to commencement of construction. If the snake does not leave on its own and cannot be relocated unharmed, construction activities within 200 feet of the snake shall stop to prevent harm to the snake. The USFWS and CDFW shall be notified by telephone or email within 24 hours of a giant garter snake observation during construction activities.
- A qualified biologist shall be available on an on-call basis during maintenance activities with the potential to affect giant garter snake. If needed, a qualified biologist shall be maintained on site during maintenance activities to ensure protection of giant garter snake. The biologist shall have the authority to stop work if a giant garter snake is encountered within the maintenance area. If a giant garter snake is observed in the maintenance area, all activities within 200 feet of the snake will stop to prevent harm to the snake.
- After April 15, any dewatered habitat shall be allowed to dry (no standing water) for at least 15 consecutive days prior to excavating or filling of the dewatered habitat.

Mitigation Measure MM-TERR-13: Restore Temporarily Disturbed Giant Garter Snake Aquatic and Upland Habitat

After completion of construction activities, the construction contractor shall remove any temporary fill, construction debris, and stockpiled materials. Giant garter snake aquatic and upland habitat subject to temporary disturbance shall be recontoured to pre-Project conditions as feasible, upland areas (grassland, riparian scrub, riparian forest, and riparian woodland) shall be reseeded with USFWS- and CDFW-approved native seed mixes and/or container plant palettes, and aquatic vegetation shall be allowed to recolonize. This restoration effort shall be conducted through consultation and a review and approval process with USFWS and CDFW and will require maintenance, monitoring, and achievement of success criteria per MM-TERR-11.

Mitigation Measure MM-TERR-14: Compensate for the Loss of Giant Garter Snake Aquatic and Upland Habitat

The permanent loss of giant garter snake aquatic and upland habitat resulting from project construction and maintenance shall be compensated for through a combination of onsite and/or offsite restoration, enhancement, and/or purchase of mitigation credits at a USFWS- and CDFW-approved conservation bank. A USFWS- and CDFW-approved biologist familiar with giant garter snake and its habitat shall conduct focused habitat assessment surveys in the Project area when final plans and specifications have been completed for the selected alternative. The biologist shall conduct an assessment of the suitability of the habitat to support giant garter snake, including an evaluation of habitat suitability for burrows and foraging. The functions and values of the affected area shall also be evaluated to establish appropriate performance standards for the mitigation site, which shall be documented in a final habitat mitigation plan.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11 through MM-TERR-14, MM-WQ-1 (*Implement a spill prevention, control, and countermeasure plan*), and MM-WQ-2 (*Implement a stormwater pollution and prevention plan*) (See Chapter 6, *Water Quality*) would reduce the impacts of project construction and maintenance on giant garter snake to **less than significant.**

9.3.3.2.4 Impact TERR-4: Potential Disturbance or Mortality of and Loss of Suitable Habitat for Western Pond Turtle

Construction of Alternative 1 would result in direct and indirect effects on suitable western pond turtle aquatic habitat (marshes, ditches, and canals) and upland habitat (woodlands, forests, or grasslands) at Tule Pond and the southern portion of the common downstream element at the southeastern corner of the FWWA. One western pond turtle was observed outside the study area along the old river oxbow during the habitat assessment conducted in 2014 and 2015 (Figure 9-1). However, focused surveys have not been conducted in the study area for this species, which is known to occur in the FWWA (DWR 2015b) and assumed to be present in areas with ponding water in the study area.

Construction-related direct effects on western pond turtle could include disturbance, removal of suitable or occupied aquatic or upland habitat, vehicle strikes, or destruction of active pond turtle nests. Temporary effects on 3.0 acres of suitable western pond turtle aquatic habitat would result from grading associated with Project construction and regrading for channel improvements at Agricultural Road Crossing 1.

Temporary effects on 25.0 acres of suitable western pond turtle upland habitat would result from constructing staging areas and access routes, establishing borrow and spoil sites, modifying channels, modifying existing structures at Fremont Weir, removing the cross canal earthen berm, construction of a bridge at the existing Agricultural Road Crossing 1, and construction of a new berm to the west of the top of Tule Canal with an inverted siphon beneath the new Tule Canal connection.

The placement of engineered streambed material (rock slope protection and riprap) along the outlet channel and the placement of rounded rock revetment on the transport channel bottom and angular rock on the transport channel bank slopes would permanently alter the substrate of 8.7 acres of suitable aquatic habitat and 35.3 acres of suitable upland habitat and habitat available for nesting along the transport channel. The removal of emergent woody debris would result in a temporal loss of basking sites before mats of floating vegetation and substrates suitable for basking such as partially submerged logs, rocks, and mud accumulate. In addition, non-woody grasses and herbaceous vegetation would be allowed to re-colonize the area, and upland areas would still provide habitat value.

Construction of Alternative 1 would partially drain Tule Pond. This would be considered a permanent reduction in the availability of suitable western pond turtle aquatic habitat that would be consistent across all alternatives except for Alternative 5 and would be subject to additional compensation/mitigation separate from the impacts shown in Table 9-6.

During operations, Alternative 1 is expected to result in conditions that are within the current range of natural variability of suitability of western pond turtle habitat in terms of inter-annual fluctuations in the duration and frequency of inundation in the Yolo Bypass. Therefore, no impacts would result from operations.

Ongoing maintenance activities are expected to include the removal of debris, vegetation, and sediment along the transport channel and at Agricultural Road Crossing 1 to maintain fish passage. These activities, in addition to vehicle strikes or nest destruction, could injure western pond turtles if they are present during maintenance. These impacts would be considered significant.

CEQA Conclusion

Direct and indirect impacts to western pond turtle resulting from construction and maintenance of Alternative 1 would be **significant** because these activities could result in the mortality or injury of individuals and a reduction in the quantity and quality of suitable western pond turtle aquatic habitat and upland habitat. During operations, there would be **no impact.**

Mitigation Measure MM-TERR-15: Conduct Surveys for Western Pond Turtle prior to Construction and Maintenance Activities

A qualified biologist shall conduct surveys for western pond turtle in suitable upland and aquatic habitat within 48 hours prior to the start of construction or maintenance activities. If there is a lapse in construction or maintenance activities of two weeks or more, the area shall be resurveyed within 24 hours prior to the recommencement of work. If western pond turtles are observed in the Project area during construction, construction activities in the vicinity shall cease until protective measures are implemented or a qualified biologist has determined that western

pond turtles will not be harmed. A qualified biologist may move the western pond turtle(s) to a suitable location outside of the Project footprint. CDFW shall be notified if any western pond turtles are relocated. If western pond turtles are observed in the Project area during maintenance, activities shall be postponed until the turtles have left the work area on their own accord or until a qualified biologist has relocated it to a suitable location outside the work area or determined the turtle will not be disturbed by maintenance activities.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11, MM-TERR-15, MM-WQ-1, and MM-WQ-2 would reduce construction, operations, and maintenance impacts on western pond turtle to **less than significant**.

9.3.3.2.5 Impact TERR-5: Potential Disturbance or Mortality of Nesting Bird Species and Loss of Suitable Nesting and Foraging Habitat[10]

Implementation of Alternative 1 would result in direct and indirect construction effects on State- and/or Federally listed bird species, including Swainson's Hawk, Least Bell's Vireo, Western Yellow-Billed Cuckoo, and Bank Swallow, and on other special-status bird species that are known or have the potential to occur in the construction study area, including bird species protected by the MBTA (see Appendix H4 for additional information on occurrences within the Yolo Bypass). Suitable nesting and foraging habitat for these birds includes grasslands, freshwater marsh, Fremont cottonwood forest, valley oak woodland, black willow thickets, open water, and agricultural fields. Construction in suitable nesting and foraging habitat during the nesting season could result in direct and indirect effects on State- and/or Federally listed bird species, special-status migratory birds, shorebirds, and raptors. Direct construction effects on nesting birds could include bird mortality or injury and grading of their nesting and foraging habitat. Indirect effects on nesting birds could result from disturbance from construction equipment, including exposure to noise from pile driving or other construction activities, vibration, and dust, which could lead to nest abandonment or failure.

White-Tailed Kite is the only CDFW fully protected species that is a potential breeder in the FWWA. It typically nests near the tops of dense oak, willow, or other trees 20 to 100 feet above ground (CDFW 2005). Because it is fully protected, construction activities that could result in the direct mortality of this species are prohibited. Avoidance of White-Tailed Kites during their nesting season (approximately February through September, with peak from May through July) is required.

The Lead Agencies anticipate construction activities for Alternative 1 to occur over one season (between April 15 and November 1), which would overlap with the nesting season for Swainson's Hawk (late March to August), Least Bell's Vireo (July 15 to August 1), Western Yellow-Billed Cuckoo (mid-June through August), Bank Swallow (early May to July), and many of the other special-status bird species. Construction and maintenance activities in and adjacent to suitable nesting and foraging habitat during the nesting season could result in direct and indirect effects on these species if they are present. These activities could result in the destruction

[10] The Biological Assessment team will coordinate with agencies regarding how to balance potential avoidance measures for birds with those for giant garter snake as they relate to clearing vegetation (timing). It may be possible to allow vegetation clearing prior to bird nesting season while still being sensitive to concerns regarding giant garter snake during their inactive period.

of nests and eggs, mortality of nestlings, or nest abandonment. These potential impacts to nesting bird species would be significant.

Construction effects would include temporary impacts to 29.2 acres of suitable nesting and foraging habitat and permanent impacts to 47.5 acres of suitable nesting and foraging habitat for these species (Table 9-6). Impacts to riparian habitat (black willow thicket, Fremont cottonwood forest, and valley oak woodland) would be considered long-term temporary impacts because it would take more than one year to establish dominant tree vegetation, which would represent a temporal loss of habitat for nesting birds.

Alternative 1 would have the lowest construction impacts to suitable nesting and foraging habitat for special-status bird species of all the Project alternatives.

Under Alternative 1, the Lead Agencies do not expect operations to result in adverse effects on suitable nesting habitat for special-status bird species because operations would extend the duration of inundation only between November and March, which is outside of the nesting season. Operational effects on foraging habitat may vary by species based on the effects of inundation on their prey. The small expected change in average number of wet days under Alternative 1 may reduce foraging habitat for some species, particularly in the eastern part of the Yolo Bypass; however, the effects on foraging habitat are not expected to be substantial. Ongoing maintenance activities could result in direct disturbance to nesting birds through vegetation removal if such activities were to occur during the nesting season.

CEQA Conclusion

Direct and indirect impacts on nesting bird species resulting from construction and maintenance of Alternative 1 would be **significant** because these activities could result in the mortality, injury, or disturbance of individuals or eggs and a reduction in the quantity and quality of suitable nesting and foraging habitat. Under operations, impacts would be **less than significant**.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11, and MM-TERR-16 would reduce construction and maintenance impacts on nesting bird species to **less than significant**.

Mitigation Measure MM-TERR-16: Conduct Surveys Prior to Construction and Maintenance Activities for Nesting Birds, Establish Nest Buffers, and Monitor Active Nests

Preconstruction nesting bird surveys shall be conducted by a qualified avian biologist within 14 days prior to construction or maintenance activities in all suitable nesting habitats in the Project area if such activities will take place between February 1 and August 31. Nesting surveys shall be conducted in accordance with the recommended timing, methodology, and or/protocol for each Federally and/or State-listed bird species as well as migratory birds. A USFWS and CDFW-approved biologist shall conduct passive surveys within 500 feet of proposed construction activities to determine the presence of Western Yellow-Billed Cuckoo, Least Bell's Vireo, Bank Swallow, and nesting migratory birds during the nesting season (June 1 through August 31 and April 1 through August 31, respectively). Surveys shall also include a 0.5-mile radius outside the Project area for Swainson's Hawk. If there is a break in construction of one week or more, surveys shall be conducted prior to the re-initiation of construction.

If nesting birds are found, the qualified avian biologist shall establish suitable buffers prior to construction or maintenance activities. To prevent encroachment, the established buffer(s) shall be clearly marked by high visibility material. The buffer distance shall be determined based on the species, type of construction activities, and line of sight to the work area. Nesting birds and offspring shall not be disturbed or killed, and nests and eggs shall not be destroyed. Work shall be conducted no less than 500 feet from an active raptor nest or nest of a Federally or State-listed species and no less than 300 feet from an active migratory bird nest. The established buffer(s) shall remain in effect until the young have fledged and are independent or the nest has been abandoned as confirmed by the qualified avian biologist. If non-listed migratory birds are showing signs of agitation within the established buffer(s) due to noise or other effects, the buffer(s) shall be expanded to prevent birds from abandoning their nest. The biologist shall have the authority to halt work if there are any signs of distress or disturbance that may lead to nest abandonment. Work will not resume until corrective measures have been taken or it is determined that continued activity would not adversely affect nest success. No construction or maintenance activities, including tree removal, shall occur in the buffer zone until the young have fledged or the nest is no longer active, as confirmed by the qualified biologist.

If active Western Yellow-billed Cuckoo or Least Bell's Vireo nests are identified within 500 feet of noise-generating construction or maintenance activities and noise is in excess of 60 dBA (decibel A weighted) hourly Leq (equivalent continuous noise level), or if noise is in excess of ambient noise levels if ambient noise levels exceed 60 dBA hourly Leq, measures will be implemented to reduce noise levels to 60 dBA hourly Leq or to ambient noise levels if ambient noise levels exceed 60 dBA hourly Leq at the nest location. Noise monitoring shall occur during the breeding season and shall be reported daily to the USFWS. A qualified biologist shall ensure that avoidance and minimization measures are implemented such that adverse effects to Western Yellow-billed Cuckoo and Least Bell's Vireo do not occur because of the adjacent construction activities (e.g., noise and lighting). If the qualified biologist suspects that avoidance and minimization measures are ineffective and project activities may adversely affect Western Yellow-billed Cuckoo or Least Bell's Vireo, culpable activities will be suspended within 500 feet of active nesting territories until nesting activity is completed and fledglings are no longer in the area or until effective avoidance and minimization measures can be identified, implemented, and demonstrated to be effective. If measures cannot be identified, implemented, and demonstrated to be effective to avoid adverse effects to these species, then project construction shall stop until consultation with the USFWS to address unanticipated impacts to these species has been completed.

9.3.3.2.6 Impact TERR-6: Potential Disturbance, Injury, or Mortality of Special-Status Tree-Roosting Bats and Removal of Roosting Habitat

Construction of Alternative 1 would result in direct and indirect effects on suitable habitat for special-status tree-roosting bats, including pallid bats and western red bats (See Appendix H4 for more detailed information for these species). Bats can occupy trees year-round and are particularly susceptible to disturbance during the maternity season and during hibernation. They roost in riparian trees and forage in adjacent riparian, grassland, and open water habitats. The FWWA is known to include highly suitable roosting habitat for these species. Construction activities are proposed to occur in these areas between April 15 and November 1, a timeframe that would overlap with the bat maternity season (generally April 15 to August 31). Tree removal could directly affect breeding and nonbreeding bats because of the loss of established roosts and potential roosting habitat. Indirect effects on breeding and nonbreeding bats could result from general disturbance, including exposure to noise, vibration, and dust.

Construction effects would include temporary impacts to 7.1 acres of suitable riparian habitat and 18.2 acres of suitable grassland and open-water roosting and foraging habitat. Impacts to riparian habitat (black willow thicket, Fremont cottonwood forest, and valley oak woodland) would be considered long-term temporary impacts because it would take more than one year to establish dominant tree vegetation, which would represent a temporal loss of habitat for special-status tree-roosting bats. In addition, construction effects would include permanent loss of 16.0 acres of suitable riparian habitat and conversion of 19.7 acres of suitable grassland and open-water foraging habitat to primarily open-water habitat that is still suitable for foraging. Alternative 1 would have the lowest construction impacts to suitable foraging habitat for special-status bat species of all the Project alternatives.

Under Alternative 1, ongoing maintenance activities involving tree removal could result in disturbance to tree-roosting bats if such activities were to occur during the maternity season. The Lead Agencies do not expect operations to result in adverse effects on tree-roosting bats as the extent of riparian areas would not be reduced by operations.

CEQA Conclusion

Direct and indirect impacts to special-status tree-roosting bats, including pallid bats and western red bats, resulting from construction and maintenance of Alternative 1 would be **significant** because these activities could result in the mortality, injury, or disturbance of individuals and a reduction in the quantity and quality of suitable or occupied habitat. During operations, there would be **no impact**.

Mitigation Measure MM-TERR-17: Conduct Surveys for Special-Status Bat Species Prior to Construction and Maintenance Activities, Establish Buffers, and Implement Protective Measures

Surveys for roosting special-status bats (including pallid bat, western red bat, and other native bat species) shall be conducted in the Project area by a qualified bat biologist where suitable habitat that might be removed, altered, or indirectly impacted during construction or maintenance is present. A qualified biologist shall conduct a habitat assessment for potentially suitable bat habitat within six months prior to construction activities. In addition, focused bat surveys shall be conducted within 48 hours prior to the start of construction activities, irrespective of the time of year construction is to start. If there is a lapse in construction activities of two weeks or greater,

the area shall be resurveyed within 24 hours prior to recommencement of work. Surveys shall also be conducted within 48 hours prior to the start of maintenance activities. Locations with potential for roosting or that are suitable as a maternity roost shall be surveyed by a qualified bat biologist using an appropriate combination of structure inspection, exit counts, acoustic surveys, or other methods. Surveys shall be conducted during the appropriate season and time of the day or night to ensure detection of day- and night-roosting bats (i.e., preferably one daytime and one nighttime survey shall be conducted at each location with suitable roosting habitat during the maternity season, April 15 through August 31, if feasible).

If a bat roost is present in the Project area in a tree that does not need to be removed, a no-disturbance buffer (typically 300 feet) shall be established and maintained throughout construction or during maintenance. If a maternity roost is identified, a no-disturbance buffer shall be established and maintained until a qualified biologist determines that the roost is no longer active.

If a bat roost is detected in a tree that needs to be removed, passive exclusion shall include monitoring the roost for three days to determine whether the roost is active. If the roost is determined by a qualified biologist to support a reproductive female with young, the roost shall be avoided until it is no longer active. If the roost remains active during the three monitoring days and observations confirm it is not a maternity colony, a temporary bat exclusion device shall be installed under the supervision of a qualified bat biologist. At the discretion of the qualified bat biologist, an alternative roosting structure(s) might be constructed and installed prior to installation of exclusion devices. Exclusion shall be conducted between August 31 and October 15 to avoid trapping flightless young inside during the summer months or torpid (overwintering) individuals during the winter. If it cannot be determined by a qualified biologist whether an active roost site supports a maternity colony, the roost site shall not be disturbed, and construction within 300 feet shall be postponed or halted until the roost is vacated and the young are able to fly.

Exclusion efforts shall be monitored on a weekly basis, continued for the duration of Project construction, and removed when no longer necessary. The following measures are also proposed to further reduce the potential for impacts to roosting and foraging special-status bats, including pallid bat and western red bat, and other native bat species, if present:

- All construction or maintenance work conducted near active roosts shall take place during the day to the extent feasible. If this is not feasible, impacts will be minimized by directing lighting and noise away from night roosting and foraging areas to the extent feasible.
- Combustion equipment (such as generators, pumps, and vehicles) shall not be parked or operated near an active roost. Construction and maintenance personnel shall not be present directly under a roosting colony. In addition, care will be taken to ensure that construction and maintenance activities do not severely restrict airspace access to the roosts.
- Tree trimming and/or tree removal associated with construction or maintenance in areas with suitable bat habitat shall only be conducted during seasonal periods of bat activity (from August 31 through October 15, a period prior to hibernation when young are self-sufficiently volant, and from March 1 to April 15 to avoid hibernating bats and prior to formation of maternity colonies), as feasible, under supervision of a qualified biologist.

- Trees shall be trimmed and/or removed in a two-phased removal system conducted over two consecutive days under the supervision of a qualified biologist. Prior to tree removal or trimming, each tree shall be shaken gently, and several minutes shall pass before felling trees or limbs to allow bats time to arouse and leave the tree. The biologist shall search downed vegetation for dead or injured bats and report any dead or injured special-status bats to CDFW. On the first day (in the afternoon), limbs and branches shall be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures shall be avoided, and only branches or limbs without those features shall be removed. On the second day, the entire tree shall be removed.
- Project proponents shall consult with a qualified bat biologist to determine suitable buffers around roost and/or hibernaculum sites. Buffers may vary depending on species and project activity being performed.
- If bats are showing signs of distress, construction and maintenance activities shall be modified to prevent bats from abandoning their roost or altering their feeding behavior, as determined by a qualified biologist. At any time, the qualified biologist shall have the authority to stop work if there are any signs of distress or disturbance that could lead to roost abandonment. Construction and maintenance work shall not continue until corrective measures have been taken or it is determined by a qualified biologist that continued activity would not adversely affect roost success.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11, and MM-TERR-17 would reduce construction and maintenance impacts to special-status tree-roosting bats to **less than significant**.

9.3.3.2.7 Impact TERR-7: Potential Disturbance or Mortality of American Badger and Loss of Its Habitat

Construction of Alternative 1 would result in direct and indirect effects on suitable habitat (open, dry areas of grassland communities) for American badger. Construction activities would result in temporary impacts to 17.9 acres and permanent impacts to 19.3 acres of potentially suitable grassland habitat (Table 9-6). Based on average territory sizes of 395 to 593 acres, the alternative would permanently impact less than five percent of a single badger's territory.

Ground-disturbing construction activities and the use of vehicles or equipment in grassland habitat could harm, displace, or disturb an American badger and could destroy American badger dens. This impact would be considered significant.

Because maintenance activities would not occur in suitable grassland habitat, there are not expected to be maintenance effects.

Under Alternative 1, the Lead Agencies do not expect operations to result in adverse effects on American badger as they would extend the duration of flooding between only November and March, which is outside the mating and birthing season.

CEQA Conclusion

Direct and indirect impacts to American badger resulting from construction of Alternative 1 would be **significant** because construction activities could result in injury or mortality. During operations and maintenance, there would be **no impact**.

Mitigation Measure MM-TERR-18: Conduct Preconstruction Surveys for American Badger

A qualified biologist shall conduct pre-construction surveys for American badger and badger dens in suitable habitat at least 48 hours prior to the start of construction activities. If there is a lapse in construction activities of two weeks or greater, the area shall be resurveyed within 24 hours prior to the recommencement of work. If a potential American badger den is identified in the Project area, an appropriate avoidance buffer shall be established based on prior coordination between DWR/Reclamation and CDFW and project activities shall avoid American badger dens and associated habitat. If avoidance is not possible, then den exclusion shall take place between September 1 and January 1. The Project shall mitigate for the loss of habitat by preserving in perpetuity existing occupied habitat at a 1:1 ratio.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6 and MM-TERR-18 would reduce construction impacts to American badger and its suitable foraging and denning habitat to **less than significant**.

9.3.3.2.8 Impact TERR-8: Potential Loss of Sensitive Natural Communities

Construction of Alternative 1 would result in direct and indirect effects on sensitive natural communities as identified by CDFW or in the *2030 Countywide General Plan*, including freshwater marsh, riparian forest, and riparian woodland. These areas are designated as sensitive natural communities because of their decline statewide, high wildlife habitat value, or hydrologic function.

Implementation of Alternative 1 would be consistent with most of the policies of the Conservation and Open Space Element of the *2030 Countywide General Plan* applicable to terrestrial biological resources (refer to Section 9.2.3.1). Alternative 1 would conflict with General Plan policies addressing preservation and enhancement of wetlands and riparian areas (Policy CO-2.3), preservation and enhancement of habitat for special-status species (Policy CO-2.4), and no net loss of oak woodlands (Policy CO-2.14). In addition, the *Yolo County Oak Woodland Conservation and Enhancement Plan* encourages voluntary preservation of oak woodlands and valley oak trees in the county. Impacts to these resources absent mitigation would conflict with these provisions.

Construction effects on sensitive natural communities would include temporary impacts to 10.1 acres and permanent impacts to 24.7 acres of California hardstem and bulrush marsh, black willow thickets, Fremont cottonwood forest, and valley oak woodland (Table 9-6). Loss of riparian vegetation, including large trees, would reduce potential nesting and roosting habitat, including perch sites, for special-status wildlife species. Loss of shaded riverine aquatic habitat provided by riparian vegetation in the Project area would reduce habitat quality by eliminating cover and food. Periodic maintenance activities would include the annual removal of woody vegetation that has grown within the channels; however, these areas are included in the area of permanent impact.

Under Alternative 1, operations would not result in adverse effects on sensitive natural communities as the Lead Agencies do not expect the increase in the duration and extent of inundation to result in a type conversion of sensitive vegetation communities to non-sensitive vegetation communities (i.e., areas of marsh, black willow thickets, Fremont cottonwood forest, and valley oak woodland are expected to remain those community types).

CEQA Conclusion

Direct and indirect impacts to sensitive natural communities, including freshwater marsh, riparian forest, and riparian woodland, resulting from construction of Alternative 1 would be **significant** because these activities could conflict with the implementation of general and/or conservation plan policies related to the protection of terrestrial biological resources. During operations and maintenance, there would be **no impact**.

Implementation of Mitigation Measures MM-TERR-2, MM-TERR-3, MM-TERR-5, MM-TERR-6, MM-TERR-11, MM-WQ-1, and MM-WQ-2 would reduce construction impacts to sensitive natural communities to **less than significant**.

9.3.3.2.9 Impact TERR-9: Potential Effects on USACE, RWQCB, and CDFW Jurisdictional Wetlands, Waters, and Riparian Areas

Construction of Alternative 1 would result in direct and indirect impacts to non-wetland waters of the United States (open water), wetland waters of the United States (temperate freshwater floating mat, water primrose wetlands, and California and hardstem bulrush marsh), and CDFW riparian areas (temperate freshwater floating mat, water primrose wetlands, California and hardstem bulrush marsh, managed annual wetland vegetation, black willow thicket, Fremont cottonwood forest, and valley oak woodland), as shown on Figures 9-3a and 9-3b Table 9-9 and Table 9-10. RWQCB impacts are not included in these tables because for 401 certifications, RWQCB jurisdiction coincides with federal waters, but they do not have a clear definition for jurisdictional limits of state waters under the Porter-Cologne Act and may extend their limits to coincide with CDFW riparian habitat limits in addition to adding isolated wetlands.

Figure 9-3a. Alternative 1 Construction Impacts to Potential USACE and CDFW Jurisdictional Areas

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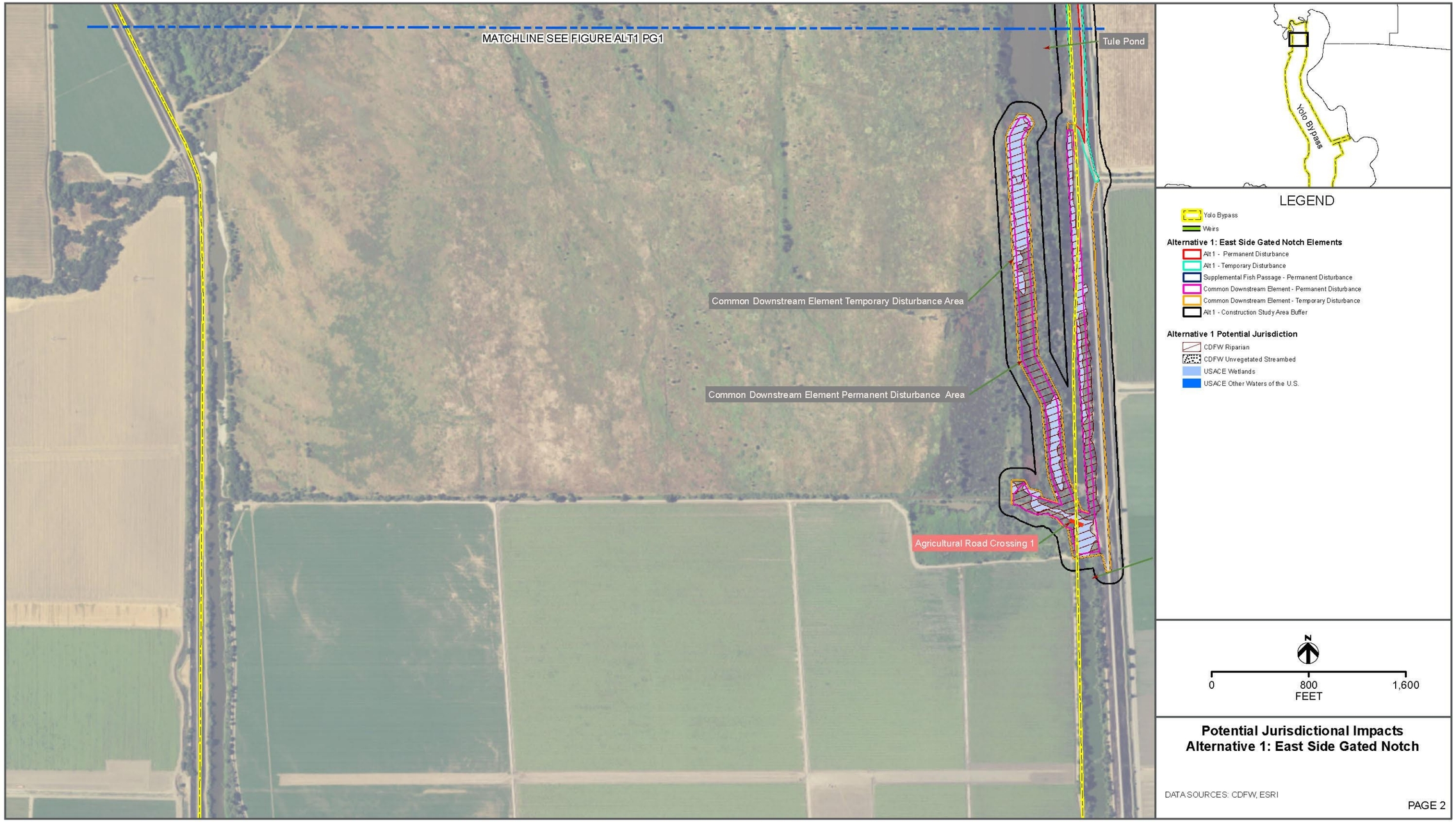

Figure 9-3b. Alternative 1 Construction Impacts to Potential USACE and CDFW Jurisdictional Areas

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Construction effects would include removal of these jurisdictional areas and replacement with concrete structures (associated with the headworks), rock-lined channels, and concrete abutments on each end of the new bridge at Agricultural Road Crossing 1 to span the Tule Canal. The channels might have volunteer plants, such as cattails and bulrush that grow up between the rocks, but there would not be active replanting of these areas. Therefore, the Lead Agencies expect that these areas would undergo a type conversion to predominantly open water and unvegetated streambed, but they would still be subject to USACE, CDFW, and RWQCB jurisdiction. As a result, the Lead Agencies do not anticipate a net loss of waters of the United States or unvegetated streambed; however, there would be a net loss of wetland and riparian habitats and the aquatic functions associated with each.

Construction effects of Alternative 1 would include temporary impacts to 3.8 acres of potential USACE wetlands and 0.3 acre of potential non-wetland waters of the United States and permanent impacts to 11.8 acres of potential USACE wetland and 0.3 acre of potential non-wetland waters of the United States. In addition, construction of Alternative 1 would result in temporary impacts to 11.0 acres of potential CDFW riparian habitat and 0.3 acre of potential CDFW unvegetated streambed, and permanent impacts to 27.9 acres of potential CDFW riparian habitat and 0.3 acre of potential CDFW unvegetated streambed. Potential construction effects also include degradation of water quality downstream of grading activities.

Alternative 1 would have the second-to-lowest permanent construction impacts to potential USACE wetlands and CDFW riparian habitat of all the Project alternatives. This alternative would involve excavation of 265,820 cubic yards of excess material (soils and vegetation) that would be disposed of at a DWR-purchased site located within two miles of the Project site. Fill material to be placed in areas subject to USACE and CDFW jurisdiction would consist of 66,860 tons of riprap and 68,618 tons of rock slope protection bedding.

Under Alternative 1, operations would not result in adverse effects on areas subject to USACE and CDFW jurisdiction as no fill materials would be placed in waters during operations.

Routine maintenance of the new concrete or rock-lined intake channel, headworks, transport channel, outtake channel, and west supplemental fish passage facility could require the removal of woody vegetation and sediment that has built up in the channels if it is determined by a qualified fish biologist that such vegetation and sediment is detrimental to fish passage. However, these activities would not result in impacts on the total acreage of USACE or CDFW jurisdiction but would impact the type of jurisdiction (e.g., CDFW riparian habitat would be converted to CDFW unvegetated streambed).

Table 9-9. Construction Impacts to Potential USACE Jurisdiction by Alternative

Potential USACE Jurisdiction	Alt. 1 Temp. (acres)[a]	Alt. 1 Perm. (acres)[a]	Alt. 2 Temp. (acres)[a]	Alt. 2 Perm. (acres)[a]	Alt. 3 Temp. (acres)[a]	Alt. 3 Perm. (acres)[a]	Alt. 4 Temp. (acres)[a]	Alt. 4 Perm. (acres)[a]	Alt. 5 Temp. (acres)[a]	Alt. 5 Perm. (acres)[a]	Alt. 6 Temp. (acres)[a]	Alt. 6 Perm. (acres)[a]
Wetlands	**3.8**	**11.8**	**2.6**	**13.3**	**3.2**	**14.1**	**27.1**	**28.2**	**0.6**	**7.5**	**2.9**	**14.8**
Temperate freshwater floating mat	0.5	1.3	0.5	1.3	0.5	1.3	0.5	1.3	0.1	0.9	0.5	1.3
Water primrose wetlands (semi-natural stands)	0.4	1.8	0.5	2.7	0.5	2.7	0.7	2.7	0.0	1.7	0.4	3.0
California and hardstem bulrush marsh	2.9	8.7	1.6	9.3	1.6	9.3	1.6	9.3	0.5	4.9	1.6	9.5
Managed annual wetland vegetation	<0.001	0.0	<0.001	0.0	0.6	0.8	24.3	14.9	0.0	<0.001	0.4	1.0
Non-wetland Waters of the United States	**0.3**	**0.3**	**1.5**	**5.8**	**0.8**	**0.8**	**7.9**	**3.0**	**1.1**	**5.0**	**1.5**	**1.4**
Open Water	0.3	0.3	1.5	5.8	0.8	0.8	7.9	3.0	1.1	5.0	1.5	1.4
Total	**4.1**	**12.1**	**4.1**	**19.1**	**4.0**	**14.9**	**35.0**	**31.2**	**1.7**	**12.5**	**4.4**	**16.2**

[a] These acreages represent a preliminary effort at determining the jurisdictional boundaries in the absence of a formal jurisdictional delineation, using the most recent regulations, policy, and guidance from the regulatory agencies. However, only the regulatory agencies can make a final determination of jurisdictional boundaries.

Key: CDFW = California Department of Fish and Wildlife; Perm. = permanent impacts; Temp. = temporary impacts; USACE = United States Army Corps of Engineers.

Table 9-10. Construction Impacts to Potential CDFW Jurisdiction by Alternative

Potential CDFW Jurisdiction	Alt. 1 Temp. (acres)[a]	Alt. 1 Perm. (acres)[a]	Alt. 2 Temp. (acres)[a]	Alt. 2 Perm. (acres)[a]	Alt. 3 Temp. (acres)[a]	Alt. 3 Perm. (acres)[a]	Alt. 4 Temp. (acres)[a]	Alt. 4 Perm. (acres)[a]	Alt. 5 Temp. (acres)[a]	Alt. 5 Perm. (acres)[a]	Alt. 6 Temp. (acres)[a]	Alt. 6 Perm. (acres)[a]
Riparian	**11.0**	**27.9**	**8.8**	**30.1**	**12.0**	**34.2**	**47.7**	**52.9**	**7.9**	**19.7**	**10.9**	**41.5**
Temperate freshwater floating mat	0.5	1.3	0.5	1.3	0.5	1.3	0.5	1.3	0.1	0.9	0.5	1.3
Water primrose wetlands (semi-natural stands)	0.4	1.8	0.5	2.7	0.5	2.7	0.7	2.7	0.0	1.7	0.4	3.0
California and hardstem bulrush marsh	2.9	8.7	1.6	9.3	1.6	9.3	1.6	9.3	0.5	4.9	1.6	9.5
Managed annual wetland vegetation	<0.001	0.0	<0.001	0.0	0.6	0.8	24.3	14.9	0.0	<0.001	0.4	1.0
Black willow thicket	<0.1	<0.1	<0.1	0.1	<0.1	0.1	4.2	0.9	0.1	1.4	<0.1	0.1
Box elder forest	0.0	0.0	0.0	0.0	0.1	0.6	0.1	0.6	0.0	0.0	0.1	1.3
Fremont cottonwood forest	5.7	12.0	5.4	11.8	7.0	14.3	14.3	17.9	6.6	8.8	6.6	18.8
Himalayan blackberry brambles	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0
Mixed hardwood forest	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0
Valley oak woodland	1.4	4.0	0.6	4.6	1.6	5.1	1.6	5.1	0.5	1.7	1.2	6.5
Unvegetated Streambed	**0.3**	**0.3**	**1.5**	**5.8**	**0.8**	**0.8**	**7.9**	**3.0**	**1.1**	**5.0**	**1.5**	**1.4**
Open Water	0.3	0.3	1.5	5.8	0.8	0.8	7.9	3.0	1.1	5.0	1.5	1.4
Total	**11.3**	**28.2**	**10.3**	**35.9**	**12.8**	**35.0**	**55.6**	**55.9**	**9.0**	**24.7**	**12.4**	**42.9**

[a] These acreages represent a preliminary effort at determining the jurisdictional boundaries in the absence of a formal jurisdictional delineation, using the most recent regulations, policy, and guidance from the regulatory agencies. However, only the regulatory agencies can make a final determination of jurisdictional boundaries.

Key: CDFW = California Department of Fish and Wildlife; Perm. = permanent impacts; Temp. = temporary impacts.

CEQA Conclusion

Direct and indirect impacts to non-wetland waters of the United States (open water), wetland waters of the United States (freshwater emergent wetland and freshwater emergent marsh), CDFW riparian areas (freshwater marsh, freshwater emergent wetland, and riparian forest/woodland), and areas subject to RWQCB jurisdiction resulting from construction of Alternative 1 would be **significant** because these activities would result in direct removal, filling, or hydrological interruption, which would result in the permanent reduction in acreage or function of these areas. During operations and maintenance, there would be **no impact** on the total acreage of USACE or CDFW jurisdiction.

Implementation of Mitigation Measures MM-TERR-2, MM-TERR-3, MM-TERR-5, MM-TERR-6, MM-TERR-11, MM-WQ-1, and MM-WQ-2 would reduce construction impacts to USACE, RWQCB, and CDFW jurisdictional areas to **less than significant**.

9.3.3.2.10 Impact TERR-10: Potential Interference with Movement of Native Resident or Migratory Wildlife Species

Construction of Alternative 1 could interfere with local movement of native resident or migratory wildlife species. Channel grading during construction could temporarily disrupt amphibian and reptile movement, including that of western pond turtle and giant garter snake, but these construction activities would not substantially interfere with the movement of these animals because they could move through adjacent upland habitat to nearby, unaffected aquatic habitat (Figures 9-2a and 9-2b). Construction activities, including movement of equipment and personnel as well as vegetation removal, could interfere with movement of other terrestrial wildlife species such as large mammals or birds, but the Lead Agencies do not expect these activities to result in substantial effects on these species with respect to movement because they are mobile and can move away from construction activities to other areas not impacted by construction, although small mammals are less mobile and would incur some direct impacts during construction. Noise from construction activities could temporarily alter foraging patterns of resident wildlife species in the Project area. Construction would occur such that the entirety of the north-south transport channel would not all be constructed at once and would, therefore, not limit east-west movement of wildlife species.

The Lead Agencies do not expect operations activities associated with implementation of Alternative 1 to adversely affect movement within the Yolo Bypass. Operations may prove beneficial for movement of some wildlife species, such as amphibians and reptiles, including giant garter snake or western pond turtle, because these activities would enhance downstream connectivity to Tule Canal. In addition, the channeling of water into the eastern transport channel would provide the same beneficial effect that existing scour ponds provide on the movement of resident and migratory terrestrial wildlife, such as mammals or birds, by providing a water source adjacent to existing foraging habitat. The changes in the expected average number of wet days resulting from operations are not expected to adversely affect wildlife movement because different areas within the Yolo Bypass would experience differential effects (i.e., some areas would have a reduced number of wet days and some areas would have an increased number of wet days), and wildlife can move around to adapt to such environmental changes.

The Lead Agencies anticipate annual maintenance activities to include the removal of debris, woody vegetation, and sediment along the transport channel and at Agricultural Road Crossing 1 to maintain fish passage. These activities would be conducted either outside the flood season or after a Fremont Weir overtopping event. These activities are not expected to adversely affect movement of wildlife.

CEQA Conclusion

Impacts on wildlife movement resulting from construction of Alternative 1 would be **less than significant** because although construction could interfere with movement of native resident or migratory wildlife species, construction activities are not anticipated to substantially interfere with the movement of these species as they could move to nearby, unaffected habitat within the FWWA. During operations and maintenance, there would be **no impact**.

9.3.3.2.11 Impact TERR-11: Conflict with Provisions of an Adopted HCP/NCCP or Other Approved Local, Regional, or State Habitat Conservation Plan

The study area is within the proposed Yolo HCP/NCCP area (ICF International, Inc. [ICF] 2017). Specifically, it lies within the North Yolo Bypass and South Yolo Bypass Planning Units. The proposed avoidance, minimization, and mitigation measures for Alternative 1 are consistent with or more comprehensive than those presented in the Draft Yolo HCP/NCCP (ICF 2017). Therefore, Alternative 1 would not conflict with the provisions of the Draft Yolo HCP/NCCP, and there would be no effect.

CEQA Conclusion

Alternative 1 is consistent with the provisions of the Draft Yolo HCP/NCCP. Therefore, there would be **no impact** resulting from conflicts with this HCP/NCCP.

9.3.3.3 Alternative 2: Central Gated Notch

Alternative 2, Central Gated Notch, would provide a similar new gated notch through Fremont Weir as described for Alternative 1. The primary difference between Alternatives 1 and 2 is the location of the notch; Alternative 2 would site the notch near the center of Fremont Weir. This gate would be a similar size but would have an invert elevation that is higher (14.8 feet) because the river is higher at this upstream location, and the gate would allow up to 6,000 cfs through to provide open channel flow for adult fish passage. See Section 2.5 for more details on the alternative features.

Implementation of Alternative 2 would result in direct and indirect construction effects on habitat for State- or Federally listed wildlife species, including valley elderberry longhorn beetle, giant garter snake, western pond turtle, Swainson's Hawk, Least Bell's Vireo, Western Yellow-Billed Cuckoo, Bank Swallow, special-status plant species (including woolly rose-mallow, northern California black walnut, bristly sedge, Peruvian dodder, Delta tule pea, Sanford's arrowhead, Suisun Marsh aster, heartscale, San Joaquin spearscale, Heckard's pepper grass, California alkali grass, and saline clover) other non-listed special-status bird species (including birds protected under the MBTA), and other special-status wildlife species (including bats and

American badger). It would also result in direct and indirect construction effects on sensitive vegetation communities, including areas potentially subject to USACE and CDFW jurisdiction.

The change in the average number of wet days within the Yolo Bypass under Alternative 2 would be similar to that described for Alternative 1.

Vegetation community impacts for Alternative 2 are shown in Table 9-6 and on Figures 9-4a and 9-4b.

9.3.3.3.1 Impact TERR-1: Potential Mortality or Loss of Habitat for Special-Status Plant Species

Alternative 2 would temporarily impact approximately the same acreage of suitable and occupied habitat for special-status plant species during construction as described for Alternative 1, but Alternative 2 would have a greater permanent impact because it would affect suitable habitat for more special-status plant species (13 compared to seven for Alternative 1). Similar to Alternative 1, Alternative 2 would impact suitable riparian habitat for woolly rose-mallow, northern California black walnut, bristly sedge, Peruvian dodder, Delta tule pea, Sanford's arrowhead, and Suisun Marsh aster during construction. In addition, Alternative 2 would impact alkaline grassland habitat for heartscale, San Joaquin spearscale, Heckard's pepper grass, California alkali grass, and saline clover, all of which are CNPS sensitive plant species, during construction. California annual herb/grassland and California naturalized annual and perennial grasslands with alkaline soils that occur along the central transport channel were not included in the 2014 and 2015 survey areas (soils map provided in Appendix H6). Freshwater marsh areas that provide suitable habitat for woolly rose-mallow, northern California black walnut, bristly sedge, Peruvian dodder, Delta tule pea, Sanford's arrowhead, and Suisun Marsh aster were adequately surveyed in 2014 and 2015, and no special-status plant species were observed other than one woolly rose-mallow plant.

Although there is abundant suitable habitat for heartscale, San Joaquin spearscale, Heckard's pepper grass, California alkali grass, and saline clover in the construction study area (over 200 acres of marsh, riparian, and grassland, Table 9-1), the presence of these species in the unsurveyed central transport channel alignment is unknown, and effects on these species cannot be determined at this time. Effects on one woolly rose-mallow plant would not be considered significant.

The effects of Alternative 2 operations and maintenance on special-status plant species and their suitable habitat would be the same as those described for Alternative 1.

Figure 9-4a. Alternative 2 Construction Impacts to Vegetation Communities

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Figure 9-4b. Alternative 2 Construction Impacts to Vegetation Communities

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CEQA Conclusion

If heartscale, San Joaquin spearscale, Heckard's pepper grass, California alkali grass, and saline clover are present in the alkaline grasslands of the Project area, impacts would be **significant** because construction of Alternative 2 could result in substantial loss of, affect the long-term survival of, or permanently reduce the acreage and quality of suitable habitat for special status plant species. This would occur through direct effects from construction or indirect effects from construction or maintenance resulting from the introduction or spread of invasive plant species. During operations, impacts would be **less than significant** because the Project is not anticipated to result in substantial mortality or loss of habitat for special-status plant species, which are tolerant of moist soils and have evolved in an area that is subject to regular inundation.

Mitigation Measure MM-TERR-19: Conduct Pre-construction Surveys for Special-Status Plant Species in Alkaline Grasslands

A qualified biologist shall conduct pre-construction surveys for special-status plant species with the potential to occur in the alkaline grassland portions of the Project area (heartscale, San Joaquin spearscale, Heckard's pepper grass, California alkali grass, and saline clover). Surveys shall be conducted during the flowering period for each special-status plant species. If one or more special-status plant species are detected, the DWR/Reclamation shall consult with the appropriate regulatory agency (CDFW) to develop additional minimization measures prior to Alternative 2 construction. These additional measures could include flagging populations to be avoided, monitoring activities near special-status plant species populations during construction, collecting seeds, and seeding or transplanting mature plants. These additional mitigation measures shall be approved by CDFW before Alternative 2 construction can proceed.

Implementation of Mitigation Measures MM-TERR-1 and MM-TERR-19 would reduce construction and maintenance impacts to **less than significant**.

9.3.3.3.2 Impact TERR-2: Potential Disturbance or Mortality of Valley Elderberry Longhorn Beetle and Loss of Its Habitat (Elderberry Shrubs)

Based on 2014 surveys, the construction disturbance area for Alternative 2, including construction, staging, and spoils areas, does not contain any elderberry shrubs, which is the host plant for valley elderberry longhorn beetle (Table 9-7). However, the 2014 surveys did not cover the entirety of the central transport channel alignment. The closest known elderberry shrub to Alternative 2 based on 2014 surveys is in riparian habitat approximately 660 feet from the supplemental fish passage structure. The fish passage structure itself would occupy an area consisting entirely of non-riparian habitat (California naturalized annual and perennial grassland and open water; see Figures 9-1 and 9-4a).

If elderberry shrubs are found during pre-construction surveys, construction of Alternative 2 could result in direct effects on the valley elderberry longhorn beetle through removal of its host plant and surrounding habitat, although impacts cannot be quantified at this time. In addition, construction of Alternative 2 could result in indirect effects on this species if construction activities indirectly affect elderberry shrubs such as from construction-generated dust, root damage, or soil compaction.

The operations and maintenance effects of Alternative 2 on valley elderberry longhorn beetle and its suitable habitat would be the same as those described for Alternative 1.

CEQA Conclusion

If elderberry shrubs are found during pre-construction surveys, potential disturbance or mortality of valley elderberry longhorn beetle and loss of its habitat would be **significant**. Maintenance impacts would be **significant** if elderberry shrubs that become established in the channels are not removed before they provide habitat for valley elderberry longhorn beetle. Operations impacts would be **less than significant** because the limited increase in the average number of wet days under Alternative 2 is not likely to lead to a type conversion of habitat that would prevent reproduction and growth of elderberry shrubs.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-11 would reduce construction and maintenance impacts to valley elderberry longhorn beetle and its habitat to **less than significant**.

9.3.3.3.3 Impact TERR-3: Potential Disturbance or Mortality of and Loss of Suitable Habitat for Giant Garter Snake

Construction of Alternative 2 would result in temporary impacts to 2.6 acres and permanent impacts to 13.3 acres of suitable giant garter snake aquatic habitat (Table 9-8). In addition, construction of Alternative 2 would result in temporary disturbance to 12.7 acres and permanent impacts to 11.9 acres of suitable giant garter snake upland habitat. Alternative 2 would impact about the same total amount of suitable giant garter snake aquatic habitat as described for Alternative 1 (15.9 acres for Alternative 2 versus 15.7 acres for Alternative 1), but would impact less upland habitat (24.6 acres for Alternative 2 versus 41.9 acres for Alternative 1).

The operations and maintenance effects of Alternative 2 on giant garter snake and it suitable aquatic and upland habitat would be the same as those described for Alternative 1.

CEQA Conclusion

Direct or indirect impacts to giant garter snake resulting from construction and maintenance of Alternative 2 would be **significant** because these activities could result in the mortality or injury of individuals and a reduction in the quantity and quality of suitable giant garter snake habitat. During operations, impacts would be **less than significant.**

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11 through MM-TERR-14, MM-WQ-1, and MM-WQ-2 would reduce the impacts of project construction, operations, and maintenance on giant garter snake and its suitable aquatic and upland habitat to **less than significant.**

9.3.3.3.4 Impact TERR-4: Potential Disturbance or Mortality of and Loss of Suitable Habitat for Western Pond Turtle

Construction of Alternative 2 would result in temporary impacts to 1.6 acres and permanent impacts to 9.3 acres of suitable western pond turtle aquatic habitat. In addition, construction of Alternative 2 would result in temporary disturbance to 26.8 acres and permanent impacts

to 65.8 acres of suitable western pond turtle upland habitat. Alternative 2 would impact 0.8 fewer acre of suitable western pond turtle aquatic habitat than Alternative 1 (10.9 acres for Alternative 2 versus 11.7 acres for Alternative 1) and 32.3 more acres of suitable western pond turtle upland habitat (92.6 acres for Alternative 2 versus 60.3 acres for Alternative 1).

The operations and maintenance effects of Alternative 2 on western pond turtle and its suitable habitat would be the same as described for Alternative 1.

CEQA Conclusion

Direct and indirect impacts to western pond turtle resulting from construction and maintenance of Alternative 2 would be **significant** because these activities could result in the mortality or injury of individuals and a reduction in the quantity and quality of suitable western pond turtle aquatic habitat and upland habitat. During operations, there would be **no impact.**

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11, MM-TERR-15, MM-WQ-1, and MM-WQ-2 would reduce construction, operations, and maintenance impacts on western pond turtle and its suitable habitat to **less than significant**.

9.3.3.3.5 Impact TERR-5: Potential Disturbance or Mortality of Nesting Bird Species and Removal of Suitable Nesting and Foraging Habitat

Construction effects of Alternative 2 on State- and/or Federally listed bird species, including Swainson's Hawk, Least Bell's Vireo, Western Yellow-Billed Cuckoo, and Bank Swallow, and on other special-status bird species that are known or have the potential to occur in the construction study area, including bird species protected by the MBTA, would include temporary impacts to 31.0 acres of suitable nesting and foraging habitat and permanent impacts to 85.2 acres of suitable nesting and foraging habitat for these species (Table 9-6). Alternative 2 would temporarily impact 1.8 more acres than Alternative 1 (31.0 acres for Alternative 2 versus 29.2 acres for Alternative 1), but would permanently impact 37.7 more acres (85.2 acres for Alternative 2 versus 47.5 acres for Alternative 1) of suitable nesting and foraging habitat. Impacts to riparian habitat (black willow thicket, Fremont cottonwood forest, and valley oak woodland) would be considered long-term temporary impacts because it would take more than one year to establish dominant tree vegetation, which would represent a temporal loss of habitat for special-status nesting birds.

The analysis of the potential significance of construction-related direct and indirect effects of Alternative 2 on nesting bird species and their suitable nesting and foraging habitat is the same as that for Alternative 1.

The operations and maintenance effects of Alternative 2 on nesting bird species and their suitable nesting and foraging habitat would be the same as those described for Alternative 1.

CEQA Conclusion

Direct and indirect impacts on nesting bird species resulting from construction and maintenance of Alternative 2 would be **significant** because these activities could result in the mortality, injury, or disturbance of individuals or eggs and a reduction in the quantity and quality of suitable nesting and foraging habitat. Under operations, impacts would be **less than significant**.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11, and MM-TERR-16 would reduce construction and maintenance impacts on nesting bird species and their suitable nesting and foraging habitat to **less than significant**.

9.3.3.3.6 Impact TERR-6: Potential Disturbance, Injury, or Mortality of Special-Status Tree-Roosting Bats and Removal of Roosting Habitat

Construction effects of Alternative 2 on special-status bat species, potentially including pallid bat and western red bat, would include temporary impacts to 6.0 acres of suitable riparian and 22.3 acres of suitable grassland and open-water roosting and foraging habitat. In addition, construction effects would include permanent loss of 16.5 acres of suitable riparian habitat and conversion of 55.1 acres of suitable grassland and open-water foraging habitat to primarily open-water habitat that is still suitable for foraging (Table 9-6). Alternative 2 would temporarily impact 3.0 more acres of suitable roosting and foraging habitat than Alternative 1 (28.3 acres for Alternative 2 versus 25.3 acres for Alternative 1) and permanently impact 35.9 more acres of suitable roosting and foraging habitat than Alternative 1 (71.6 acres for Alternative 2 versus 35.7 acres for Alternative 1). Impacts to riparian habitat (black willow thicket, Fremont cottonwood forest, and valley oak woodland) would be considered long-term temporary impacts because it would take more than one year to establish dominant tree vegetation, which would represent a temporal loss of habitat for special-status tree-roosting bats.

The analysis of the potential significance of construction-related direct and indirect effects of Alternative 2 on special-status bat species and their suitable roosting habitat is the same as that for Alternative 1.

The operations and maintenance effects of Alternative 2 on special-status bat species and their suitable roosting habitat would be the same as those described for Alternative 1.

CEQA Conclusion

Direct and indirect impacts to special-status tree-roosting bats, including pallid bats and western red bats, resulting from construction and maintenance of Alternative 2 would be **significant** because these activities could result in the mortality, injury, or disturbance of individuals and a reduction in the quantity and quality of suitable or occupied habitat. During operations, there would be **no impact**.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6, MM-TERR-11, and MM-TERR-17 would reduce construction and maintenance impacts to special-status bat species and their suitable roosting habitat to **less than significant**.

9.3.3.3.7 Impact TERR-7: Potential Disturbance or Mortality of American Badger and Loss of Its Habitat

Construction effects of Alternative 2 on suitable American badger foraging and denning habitat would include temporary impacts to 20.8 acres and permanent impacts to 49.3 acres of potentially suitable grassland habitat (Table 9-6). Alternative 2 would temporarily impact 2.9 more acres of suitable foraging and denning habitat for American badger than Alternative 1 (20.8 acres for Alternative 2 versus 17.9 acres for Alternative 1), but would permanently impact 30.0 more acres than Alternative 1 (49.3 acres for Alternative 2 versus 19.3 acres for Alternative 1).

The analysis of the potential significance of construction-related direct and indirect effects of Alternative 2 on American badger and its suitable foraging and denning habitat is the same as that for Alternative 1.

The operations and maintenance effects of Alternative 2 to American badger and its suitable foraging and denning habitat would be the same as those described for Alternative 1.

CEQA Conclusion

Direct and indirect impacts to American badger resulting from construction of Alternative 2 would be **significant** because construction activities could result in injury or mortality. During operations and maintenance, there would be **no impact**.

Implementation of Mitigation Measures MM-TERR-2 through MM-TERR-6 and MM-TERR-18 would reduce construction impacts to American badger and its suitable foraging and denning habitat to **less than significant**.

9.3.3.3.8 Impact TERR-8: Potential Loss of Sensitive Natural Communities

Construction effects of Alternative 2 on sensitive natural communities would include temporary impacts to 7.6 acres and permanent impacts to 25.8 acres of California hardstem and bulrush marsh, black willow thickets, Fremont cottonwood forest, and valley oak woodland (Table 9-6). Alternative 2 would temporarily impact 2.5 fewer acres than Alternative 1 (7.6 acres for Alternative 2 versus 10.1 acres for Alternative 1) and permanently impact 1.1 more acres than Alternative 1 (25.8 acres for Alternative 2 versus 24.7 acres for Alternative 1) of sensitive natural communities.

The analysis of the potential significance of construction-related direct and indirect effects of Alternative 2 on sensitive natural communities is the same as that for Alternative 1.

The operations and maintenance effects of Alternative 2 would be the same as those described for Alternative 1.

CEQA Conclusion

Direct and indirect impacts to sensitive natural communities, including freshwater marsh, riparian forest, and riparian woodland, resulting from construction of Alternative 2 would be **significant** because these activities could conflict with the implementation of general and/or conservation plan policies related to the protection of terrestrial biological resources. During operations and maintenance, there would be **no impact**.

Implementation of Mitigation Measures MM-TERR-2, MM-TERR-3, MM-TERR-5, MM-TERR-6, MM-TERR-11, MM-WQ-1, and MM-WQ-2 would reduce construction impacts to sensitive natural communities to **less than significant**.

9.3.3.3.9 Impact TERR-9: Potential Effects on USACE, CDFW, and RWQCB Jurisdictional Wetlands, Waters, and Riparian Areas

Impacts to potential USACE and CDFW jurisdiction resulting from construction of Alternative 2 are shown on Figures 9-5a and 9-5b. Construction effects of Alternative 2 would include

temporary impacts to 2.6 acres of potential USACE wetlands and 1.5 acres of potential non-wetland waters of the United States, and permanent impacts to 13.3 acres of potential USACE wetlands and 5.8 acres of potential non-wetland waters of the United States. In addition, construction of Alternative 2 would result in temporary impacts to 8.8 acres of potential CDFW riparian habitat and 1.5 acres of potential CDFW unvegetated streambed, and permanent impacts to 30.1 acres of potential CDFW riparian habitat and 5.8 acres of potential CDFW unvegetated streambed (Table 9-9 and Table 9-10). Compared to Alternative 1, Alternative 2 would temporarily impact the same amount of USACE jurisdiction (4.1 acres for both alternatives) and 1.0 less acre of CDFW jurisdiction (10.3 acres for Alternative 2 versus 11.3 acres for Alternative 1). In addition, Alternative 2 would permanently impact 7.0 more acres of USACE jurisdiction (19.1 acres for Alternative 2 versus 12.1 acres for Alternative 1) and 7.7 more acres of CDFW jurisdiction (35.9 acres for Alternative 2 versus 28.2 acres for Alternative 1).

The analysis of the potential significance of construction-related direct and indirect effects of Alternative 2 on potential USACE, CDFW, and RWQCB jurisdictional areas is the same as that for Alternative 1.

The operations and maintenance effects of Alternative 2 on potential USACE, CDFW, and RWQCB jurisdictional areas would be the same as those described for Alternative 1.

CEQA Conclusion

Direct and indirect impacts to non-wetland waters of the United States (open water), wetland waters of the United States (freshwater emergent wetland and freshwater emergent marsh), CDFW riparian areas (freshwater marsh, freshwater emergent wetland, and riparian forest/woodland), and areas subject to RWQCB jurisdiction resulting from construction of Alternative 2 would be **significant** because these activities would result in direct removal, filling, or hydrological interruption, which would result in the permanent reduction in acreage or function of these areas. During operations and maintenance, there would be **no impact**.

Implementation of Mitigation Measures MM-TERR-2, MM-TERR-3, MM-TERR-5, MM-TERR-6, MM-TERR-11, MM-WQ-1, and MM-WQ-2 would reduce construction impacts to USACE, RWQCB, and CDFW jurisdictional areas to **less than significant**.

Figure 9-5a. Alternative 2 Construction Impacts to Potential USACE and CDFW Jurisdictional Areas

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Figure 9-5b. Alternative 2 Construction Impacts to Potential USACE and CDFW Jurisdictional Areas

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