

3.4 BIOLOGICAL RESOURCES

This section evaluates potential impacts to biological resources resulting from the proposed Project. Biological resources include known or potentially occurring special-status species, wildlife habitats, and vegetation communities. In preparing this analysis, publically available documents were reviewed, including the Watershed Management Action Plan (WMAP) (EDAW, 2005) and the Habitat Assessment (Stillwater Sciences, 2015) as well as relevant databases (California Natural Diversity Database) (CNDDDB), U.S. Fish & Wildlife Service (USFWS) Critical Habitat Mapper, and other resources. This section also incorporates the results of a draft wetland delineation for the Project Area (BSK, 2015a). The Habitat Assessment appears as **Appendix D** in this EIR.

The following CEQA Guidelines Appendix G biological resources topic is not addressed in this Program EIR (PEIR) because no conservation plans are applicable to the Project Area:

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

3.4.1 Setting

Environmental Setting

Changes from Historic Conditions

Putah Creek's channel, floodplain and riparian zone are all directly influenced by the creek's hydrology. Much of the streamflow in the Project watershed is regulated by dam operations, resulting in changed riparian conditions and habitat compared to historic conditions (EDAW, 2005). Periodic high flows that maintained the channel by flushing out fine sediment, moving the gravel bed-load, and overturning the organic matter in the corridor have been substantially diminished by upstream diversion. These reduced high flows have resulted in less stream energy to create and maintain aquatic habitat complexity and new growing space for different classes of riparian vegetation.

Biological Communities

The biological communities expected or known to occur within the general Project Area, and their associated special-status wildlife species, sensitive plants, and critical habitat, are discussed in this section.

Overview of Habitat Types

Habitat within the Project Area consists of a deeply entrenched, single-thread stream channel with a few small islands and limited floodplains, within stream terraces bordered by a narrow band of transitional Valley oak woodlands, surrounded by ruderal grassland and cultivated fields and orchards. The channel in the Project Area consists primarily of pools that contain slow-moving water. Human-created pools along lower Putah Creek typically have higher water temperatures and create different habitat characteristics than the natural state of the creek (Stillwater Sciences, 2015). The tributaries that enter the Project Area provide nutrients and sediment to Putah Creek. These tributaries provide additional habitat for Putah Creek species.

Habitat types transition from the most upstream reaches, just below the Putah Diversion Dam (PDD), where there is some distinct floodplain, to the leveed reaches beginning at the City of Davis, to the seasonally impounded reaches near the Yolo Bypass Wildlife Area (YBWA). Cross-sections of the Project Area identifying the change between top of bank, low-flow channel, and entrenched reaches were prepared for the Draft Ordinary High Water Mark (OHWM) and Wetland Delineation Report (BSK, 2015a). The different floodplain characteristics create the different dominant habitats throughout the Project Area. Most of Putah Creek is entrenched; these entrenched reaches typically have several internal, low terraces with different soils and vegetation. These provide internal connectivity where nutrients and species can move within and between the terraces. This connectivity and complexity of different habitat patches is critical for aquatic and riparian functions. It provides riparian aestivation habitat for species such as western pond turtle (*Emys marmorata*), and habitat for Swainson's hawk (*Buteo Swainsoni*), song sparrow (Modesto population, *Melospiza melodia*), white-tailed kite (*Elanus leucurus*) and valley elderberry longhorn beetle (VELB, *Desmocerus californicus dimorphus*). Leveed reaches are completely disconnected from the potential natural floodplain, the channels are filled with pools, and these reaches do not provide important habitat for the above special-status species.

Habitat Types

The Project Area contains primarily slow-water aquatic habitat separated by shallow riffles. Aquatic habitat in the Project Area is used by a variety of resident and migratory, species such as North American river otter (*Lontra canadensis*), North American beaver (*Castor canadensis*), western pond turtle, hardhead (*Mylopharodon conocephalus*), Chinook salmon (*Oncorhynchus tshawytscha*) and other fish species. EDAW 2004-5 surveys of habitats between the PDD and the Yolo Bypass found that over 72 percent of aquatic habitat was comprised of pool habitat, 23 percent of run habitat, and 5 percent

of riffle habitat (EDAW 2005, pp. 5-47-5-48). Much of the pool habitat is a result of historic in-channel gravel mining. Some reduction in pool habitat and increase in run habitat has resulted from restoration projects implemented since 2005 (e.g., Winters Putah Creek Park restoration area). The extensive pools limit available salmonid spawning habitat and increase water temperatures, both of which are adverse to native fish species such as Chinook salmon, and beneficial for non-native species such as largemouth bass (*Micropterus salmoides*).

As discussed in Section 3.1, *Hydrology*, gravel recharge in the Project reach has been substantially reduced compared with natural conditions, because coarser sediments have been captured behind dams or in the former gravel mining pits along the channel. This has deprived the creek of necessary materials to build riffles and other spawning beds.¹ As a result, spawning gravel for salmonids downstream of the PDD is limited, particularly for Chinook salmon. Surveys estimate that only approximately 1.9 miles of Chinook salmon spawning habitat exists within the approximately 24.2 miles of Putah Creek between the Yolo Bypass and the PDD (Stillwater Sciences, 2015, p. 10).

Relative to the rest of the Project Area, a unique floodplain habitat exists along the lower reaches of the Project Area (Mace to Road 106A Reach and Road 106A to Yolo Bypass Wildlife Area Reach). During high flow events when the Yolo Bypass is inundated and high flow events occur in Putah Creek, the Bypass floodplain habitats are connected to the Putah Creek channel. In such seasonal flood periods, the floodplain habitat of the Yolo Bypass is used for spawning and/or rearing by several special-status fish species such as Chinook salmon.

Riparian habitat is found parallel to the aquatic and wetland habitats throughout the Project Area. This habitat is largely dependent on the water flow in relation to the edges of the creek. Riparian habitat throughout the Project Area contains special-status species such as VELB, western pond turtle, song sparrow (Modesto population), white-tailed kite, and Swainson's hawk. Non-special-status species found throughout riparian habitat include North American beaver and North American river otter. Both of these species move between aquatic and riparian habitat.

The Project Area includes approximately 556 acres of National Wetland Inventory defined wetlands. These wetlands are found mainly within the channel, with one

¹ A Central Valley river analysis for spawning habits of Chinook salmon revealed that Chinook salmon preferentially use riffles for spawning (Pasternack, 2010, p. 15).

identified adjacent wetland located in the Duncan-Giovannoni Reach. The riparian habitat consists of these wetlands.

Terrestrial habitat is found in the upper terraces of the reaches upstream of the Olmo-Hammond-UC Davis Reach of the Project Area, and outside of the incised channel below this reach. Terrestrial habitat many contain special-status species such as VELB, Swainson's hawk, song sparrow (Modesto population) and white-tailed kite.

Plant and Animal Species and Communities

Plant Communities

Most reaches are dominated by non-native invasive weeds in at least one, and typically two, canopy layers. The classified plant community types in the Project Area are mixed riparian forest, disturbed riparian woodland and riparian and transitional valley oak woodland. Less contiguous and less common plant community types include narrow fringes of riverine emergent wetlands in slow-moving sections of the creek (small patches of cattails [*Typha* spp.] and tules [*Schoenoplectus* spp.]), and small patches of annual grassland dominated by invasive annual plants (Mediterranean barley [*Hordeum marinum sub sp. gussoneum*] and slender oat [*Avena barbata*]). Other plant community types include ruderal associations and agricultural crops, as well as one seasonal wetland.

The following plant community descriptions are derived largely from the WMAP (EDAW, 2005), and are considered representative of current plant community conditions:

Mixed Riparian Forest

The most common plant community in the lower Putah Creek riparian corridor is Mixed Riparian Forest. The width and complexity of Mixed Riparian Forest varies and is characterized by one or more well-developed canopy layers, consisting of an upper layer of tall Fremont cottonwood trees (*Populus fremontii*); intermediate canopy layers composed of Valley oak, (*Quercus lobata*), Oregon ash (*Fraxinus latifolia*), Goodding's willow (*Salix gooddingii*), box elder (*Acer negundo var. californica*), and live oak (*Quercus wislizeni*); and a discontinuous shrub layer comprised of blue elderberry (*Sambucus nigra ssp. caerulea*), button bush (*Cephalanthus occidentalis*), Himalayan blackberry (*Rubus armeniacus*), wild rose (*Rosa californica*), poison oak (*Toxicodendron diversilobum*), and wild grape (*Vitis californica*). In some areas of the creek, a sub-canopy layer consists of dense riparian vegetation dominated by willow species including arroyo willow (*Salix lasiolepis*) and sandbar willow (*S. exigua*). Many invasive

plants have colonized the Mixed Riparian Forest, including tamarisk (*Tamarix* spp.), arundo (*Arundo donax*), and tree-of-heaven (*Ailanthus altissima*) in the subcanopy and shrub layers, and Northern California black walnut hybrids (*Juglans* spp.) in the upper canopy (EDAW, 2005).

Disturbed Riparian Woodland

Disturbed Riparian Woodland is dominated by invasive tree species such as Eucalyptus (*Eucalyptus* spp.) and tree-of-heaven. Eucalyptus leaves and roots alter soil chemistry and inhibit the germination and growth of other species. Invasive plants can quickly proliferate and displace native plant populations and contribute to a loss of habitat to native wildlife dependent on those plants. Invasive plants can also affect the balance of natural processes such as the frequency and extent of fires, flooding, sediment transport, erosion and channel formation, and nutrient cycling. Such alterations can contribute to further habitat loss and damage human infrastructure and land uses causing economic hardship and safety concerns (EDAW, 2005). Disturbed Riparian Woodland can also include native tree, shrub, and herbaceous species such as cottonwood, Goodding's willow, alder (*Alnus* spp.), Oregon ash, box elder and walnut hybrids (Stillwater Sciences, 2015, pp. 8-9).

Agricultural Crops

Agricultural crops make up the vast majority of vegetation either just within or adjacent to the top of the creek bank within the Project Area. Typical agricultural crops include walnut and almond orchards, vineyards, barley, wheat, tomatoes, safflower, milo (sorghum), ryegrass, Japanese millet, and vetch (Stillwater Sciences, 2015, p. 10).

Annual Grasslands

Small patches of Annual Grasslands are distributed throughout the Project Area in places that are slightly upland and not used as cropland. These areas can support non-wetland species and are typically grazed by livestock in the spring and summer. Common species include a variety of non-native grasses and forbs such as medusahead (*Elymus caput-medusae*), soft chess (*Bromus hordeaceus*), filaree (*Erodium botrys*), Mediterranean barley, slender oat, ripgut brome (*Bromus diandrus*), and rose clover (*Trifolium hirtum*). Annual Grasslands may occasionally contain small areas of perennial native grasses, including purple needlegrass (*Stipa pulchra*) and creeping wildrye (*Elymus triticoides*) (Stillwater Sciences, 2014, p. 15). These patches of native grasslands are very small and scattered in areas with relict floodplains, and prior restoration areas.

Riverine Wetland

Riverine Wetlands within the Project Area are perennial wetlands along the creek channel and lower bank, instream wetlands that formed on sand or gravel bars, and patches of emergent freshwater marsh. Riverine Wetlands are influenced by frequent flooding, scour, and seasonal and annual water level fluctuations.

In areas most clearly defined as freshwater emergent marsh, the habitat type is dominated by cattails, tules, and California bulrush (*Schoenoplectus californicus*). Common associates in these and more seasonal types of Riverine Wetlands include smartweed (*Polygonum* spp.), umbrella sedge (*Cyperus eragrostis*), sedges (*Carex* spp.), common rush (*Juncus effusus*), mugwort (*Artemisia douglasiana*), cocklebur (*Xanthium strumarium*), rice cutgrass (*Leersia oryzoides*), canary grass (*Phalaris* spp.), field mint (*Mentha arvensis*), and western goldenrod (*Euthamia occidentalis*) (Stillwater Sciences, 2015, p. 9).

Seasonal Wetland

One Seasonal Wetland was identified within the Project Area. This habitat is dominated by invasive species including rabbitsfoot grass (*Polypogon monspeliensis*), Italian ryegrass (*Festuca perennis*), curly dock (*Rumex crispus*), perennial pepperweed (*Lepidium latifolium*), and dallisgrass (*Paspalum dilatum*) (Stillwater Sciences, 2014, p. 16).

Ruderal

Ruderal vegetation occurs throughout the Project Area in the riparian corridor and particularly along the edge of agricultural fields. These areas are generally disturbed by adjacent land uses (farming, roadsides) and are therefore dominated by non-native herbs such as yellow starthistle (*Centaurea solstitialis*), milk thistle (*Silybum marianum*), Italian thistle (*Carduus pycnocephalus*), prickly lettuce (*Lactuca serriola*), mustard species (*Brassica nigra*, *Hirschfeldia incana*), soft chess, ripgut brome, and wild oat (*Avena fatua*) (EDAW 2005, as referenced in Stillwater Sciences, 2015, p. 9).

Riparian Shrublands

Riparian shrubs and shrub complexes occur throughout the Project Area along the channel and within the streambed on gravel bars. Dominant species in this shrub dominated habitat type include sandbar willow, arroyo willow, Gooding's willow, and red willow. Sometimes the early-successional stage stands of mixed riparian forest (e.g., arroyo willow) are considered part of Riparian Shrubland because of the shrub-like low stature of the trees. Stands typically lack a developed understory, but may support an

understory of wild rose, wild grape, and various non-native grasses. Riparian Shrublands can be overtopped by Himalayan blackberry or English ivy (EDAW, 2005 as referenced in Stillwater Sciences, 2015, p. 8).

Special-Status Vegetation Alliances

The vegetation alliances found within the Project Area have global rankings and/or a state rankings that rank their rarity, threat level, and viability trends. Global rankings reflect the overall status of an alliance element throughout its global range, while state rankings reflect the imperilment status of an element within California only (CNPS, 2001, pp. 5-6). Rankings are critical at the G1, G2, S1, and S2 levels. These ranking descriptions are as follows:

- A. G1 = Critically Imperiled—At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
- B. G2 = Imperiled—At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
- C. S1 = Critically Imperiled—Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
- D. S2 = Imperiled—Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province (CNPS, 2001, pp. 5-6).

The following vegetation alliances and their rankings are found throughout the Lower Putah Creek Project Area (CDFG, 2010; Stillwater Sciences, 2015):

- *Quercus lobata* (Valley oak woodland) Alliance:
Valley Oak Woodland: (G3 S2)
- *Populus fremontii* (Fremont cottonwood forest) Alliance:
Great Valley Cottonwood Riparian Forest (G2 S2)
- *Sambucus nigra* (Blue elderberry stands) Alliance:
Elderberry Savanna: (G2 S2)

Special-Status Species

In general, special-status species include plants and wildlife that are:

- Listed and protected under the Federal and/or California Endangered Species Acts
- Protected under other federal and/or state laws and regulations (CDFG, 2011, pp. 1-2; USACE, 2006; p. 1)

Specifically, special-status species are those that are officially designated as “threatened” or “endangered,” species by USFWS; are officially designated as “rare,” “threatened,” “endangered,” or “candidate” species by California Department of Fish and Wildlife (CDFW); are listed as “Fully Protected” (FPS) or “Species of Special Concern” (SSC) by the CDFW; or are considered rare, threatened, or endangered under the conditions of Section 15380 of the CEQA Guidelines, such as plant taxa identified on lists 1A, 1B, 2A, 2B, 3, and 4 in the California Native Plant Society (CNPS) Inventory of Rare and Endangered Vascular Plants of California. Some species also may be designated as species of special concern by local jurisdictions (often due to limited data regarding distribution, which precludes listing them as threatened or endangered at the state or federal level).

This analysis compiled a list of special-status species that have potential to occur in the Project Area, which is provided in **Appendix E**. Following the compilation, the species habitat requirements were compared to available habitat and relative habitat factors such as density, age, size, nearest occurrence, and others, to create a consolidated list of species that have a likelihood of occupying the Project Area.

Special-Status Species Likely to be May Be Present in the Project Area

Table 3.4-1 below lists the special-status species that are likely to be present in the Project Area, describes their status and habitat, and lists the rationale for why they may be present. The species that may be present in the Project Area were determined by reviewing existing species data and an analysis of habitat conditions. All of the special-status species likely to occur in the Project Area are animal species; no special-status plant species are likely to occur in the Project Area (also see Figures 3.4-1 and 3.4-2).

The following species have a high likelihood to be present within the Project Area: Pacific lamprey (*Entosphenus tridentatus*), Chinook salmon, song sparrow (Modesto population), Swainson’s hawk, white-tailed kite, valley elderberry longhorn beetle, and western pond turtle. It should be noted that Baker’s navarretia (*Navarretia leucocephala* ssp. *bakeri*), vernal pool fairy shrimp (*Branchinecta lynchi*), steelhead

Table 3.4-1 Special-Status Animal Species Present in the Project Area

Common Name	Scientific Name	Status Fed/ State	Habitat	Rationale
Pacific lamprey	<i>Entosphenus tridentatus</i>	FSC/SSC	Cold, clear water for spawning and incubation. Require gravel to build nests, and soft sediment to burrow during rearing.	Pacific lamprey have been reported to maintain small runs in Putah Creek (Moyle, 2002). Ammocoetes and juveniles are expected to be present year-round upstream of approximately Highway 505.
Central Valley fall-run Chinook salmon	<i>Oncorhynchus tshawytscha</i>	FSC/SSC	Freshwater streams with cold water and available spawning gravel. Typically rear in freshwater for one or more years before migrating to the ocean.	Within species known range. Rearing and migratory habitat is present in Putah Creek with observations documented in the Yolo Bypass and Putah Creek (Stillwater Sciences 2015). Fall-run Chinook may occur within the project area from fall through early summer.
Song sparrow (Modesto population)	<i>Melospiza melodia</i>	--/SSC	Dense vegetation, water source, semi-open canopies to allow light and exposed ground or leaf litter.	CNDDDB has mapped this species to within 1 mile of the Project Area. Habitat at the Project location is suitable for use by this species. Therefore, it is possible that <i>Melospiza melodia</i> would be present within the reaches downstream of I-80 to Old Davis Road Reach.
Swainson's hawk	<i>Buteo Swainsoni</i>	--/ST	Open grassland areas with scattered trees. Nesting occurs in trees and shrubs that are isolated, clumped or part of shelterbelts.	Habitat is suitable for Swainson's hawk nesting and foraging. CNDDDB maps multiple recorded occurrences of this species within the Project Area. It is likely that Swainson's hawk would be present within all reaches of the Project Area.
white-tailed kite	<i>Elanus leucurus</i>	--/FP	Oak woodlands or trees along marsh edges. Typical trees include eucalyptus, cottonwoods, toyons, and coyote brush.	Habitat is not ideal, mainly forage in area. CNDDDB maps this species within the Project Area. It is possible that this species may be present within all reaches of the Project Area.
valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT/--	Riparian habitats and associated upland habitats where elderberry (<i>Sambucus</i> spp.) grows.	CNDDDB maps this species within the Project Area and the species' host plant (i.e., suitable habitat) exists throughout the Project Area. It is possible that valley elderberry longhorn beetle would be present within all reaches of the Project Area.
western pond turtle	<i>Emys marmorata</i>	--/SSC	Calm waters, such as streams or pools, with vegetated banks and log or rock basking sites.	Habitat is suitable for nesting and foraging. CNDDDB maps this species within the Project Area. It is possible that western pond turtle would be present within all reaches of the Project Area.

Figure 3.4-1 Special-Status Animals in Project Vicinity

Figure 3.4-2 Special-Status Plants in Project Vicinity

(*Oncorhynchus mykiss*), least Bell's vireo (*Vireo Bellii pusillus*), tricolored blackbird (*Agelaius tricolor*), northern harrier (*Circus cyaneus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), giant garter snake (*Thamnophis gigas*), California red-legged frog (*Rana draytonii*), western red bat (*Lasiurus blossevillei*), and pallid bat (*Antrozous pallidus*) have been identified regionally, but only occasionally and in habitat different than the vast majority of the Project Area. These species are considered to have moderate, low, or no likelihood to be present due to lack of suitable habitat or lack of documented occurrences. Species noted as being unlikely to occur within the Project Area are considered to be beyond their known range or to have low habitat suitability for reproduction, cover, and/or foraging (Appendix E). The following are the characteristics and habitats of special-status species that have been identified regionally in the area. As stated above, not all of these species are likely to be present in the Project Area. Information on species determined not to be present is included as background information.

Raptors and Migratory Birds

Active bird nests are typically protected under the Migratory Bird Treaty Act (MBTA) and Section 3503.5 of the California Fish and Game Code (CDFGC), which prohibits their disturbance or destruction, with certain exceptions.

Song Sparrow (Modesto Population) (*Melospiza melodia*)

Song sparrow can be found in the north-central portion of the Central Valley, with the densest populations in the Butte Sink area of the Sacramento Valley and the Sacramento-San Joaquin River Delta (Shuford and Gardali, 2008). The species prefers emergent freshwater marshes dominated by tules, and requires dense vegetation to supply cover for nest sites, a source of standing or running water, semi-open canopies to allow light, and exposed ground or leaf litter for foraging (Shuford and Gardali, 2008). This species has the potential to be present in the Project Area, especially in the downstream reaches east of Interstate 80 (I-80). This species is a CDFW species of special concern (SSC) (CDFW, 2016).

Swainson's Hawk (*Buteo Swainsoni*)

Swainson's hawk primarily nest in a few species of trees, including oaks, cottonwoods, sycamores, or willows (Schlorff and Bloom, 1983; CDFG, 1994 as referenced in Stillwater Sciences, 2015). These species of trees are found throughout the entire Project Area. While not necessarily a riparian species, nesting trees associated with Swainson's hawk are found in riparian areas, usually associated with main river channels (Bloom, 1980; Estep, 1989, as referenced in Stillwater Sciences, 2015). This species has been observed

within the Project Area. This species is classified “threatened” under California Endangered Species Act (CESA) (CDFW, 2016).

White-tailed Kite (*Elanus leucurus*)

White-tailed kite is a resident species throughout central and coastal California (Stillwater Sciences, 2015). This species is found primarily in riparian corridors and prefer habitat with lowland grasslands, tree groves for perching and nesting, and open areas that support small mammals (Stillwater Sciences, 2015). White-tailed kite is a fully protected species by CDFW (CDFW, 2016). This species is present within the Project Area.

Least Bell’s Vireo (*Vireo Bellii pusillus*)

Least Bell’s vireo prefer habitat that has dense riparian shrubs near flowing water or dry watercourses in the desert. The Project Area does contain riparian shrubs and habitat suitable for this species. However, the only observation of this species in the region of the Project Area was downstream of the most eastern reach of the Project Area. This species has the potential to be present downstream of I-80, but it is unlikely this species is present within the Project Area. This species is both federally and state “endangered” (CDFW, 2016).

Tricolored Blackbird (*Agelaius tricolor*)

This species is a year-round resident in California, where it is largely endemic. Nesting colonies of tricolored blackbirds are protected as a candidate species for listing under the CESA (CDFW, 2016). The large nesting colonies typically occur within protected stands of cattails, tules, blackberry brambles, or willows, and near open, accessible water (Beedy and Hamilton, 1997; Hamilton 2004). There may be suitable nesting habitat in expansive marsh vegetation or large blackberry thickets along Putah Creek. There have been eight documented sightings of tricolored blackbird during surveys reported by Truan et al. (2010) from 1997 to 2010, though their surveys were not designed to detect tricolored blackbird in numbers. Tricolored blackbirds were observed at Los Rios Farms, Putah Creek Sinks, Mace Boulevard, and the Center for Land-based Learning (Truan et al., 2010). However, no nesting colonies have been found within the riparian zone immediately adjacent to Putah Creek, so it is unlikely any nesting colonies will be present within the Project Area.

Northern Harrier (*Circus cyaneus*)

Northern harrier is a SSC when nesting (CDFW, 2016). Northern harrier has been observed throughout the Project Area (eBird, 2014). Truan et al. (2010) reports most

sightings in the I-80 to Old Davis Road Reach and at UC Davis Picnic Grounds. Breeding also was documented in the I-80 to Old Davis Road Reach (Truan et al., 2010). However, it is unlikely this species nests within the Project Area because there is very limited ground-nesting habitat available within the riparian corridor.

Western Yellow-Billed Cuckoo (*Coccyzus americanus occidentalis*)

Western yellow-billed cuckoo is federally threatened, and is state-listed as endangered (CDFW, 2016). On August 15, 2014, USFWS proposed to designate critical habitat in California, which does not include areas along Putah Creek (Stillwater Sciences, 2015). The western yellow-billed cuckoo is presently a rare migrant in Yolo County. Because individual western yellow-billed cuckoos have been documented within the Project Area, which overlaps with their historical range, this species has potential to occur, but is not expected to nest, within the Project Area.

Invertebrates

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

The VELB is found throughout the Project Area. This species is primarily hosted in elderberry (*Sambucus* spp.) plants. Identification of VELB typically is performed through an examination of boreholes on elderberry plants. This species has a high occurrence potential within the Project Area, especially in the upstream reaches west of I-80 (Stillwater Sciences, 2015). This species is federally listed as “threatened” (CDFW, 2016).

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp is federally threatened (CDFW, 2016). They are found in vernal pools and sandstone rock outcrop pools. The vernal pool fairy shrimp does not occur in areas subject to flooding from rivers or other waterways. There is no suitable habitat present within the Project Area for this species.

Reptiles

Western Pond Turtle (*Emys marmorata*)

The western pond turtle prefers habitat that contains fresh or brackish deep water, low flow velocities, basking areas, warm water, and riparian vegetation. Additionally, the species requires underwater cover to protect itself from predators (Stillwater Sciences, 2015). This species has a status of SSC under CDFW (CDFW, 2016). This species has the potential to be present throughout the Project Area.

Giant Garter Snake (*Thamnophis gigas*)

The giant garter snake prefers sloughs, canals, and low gradient streams for habitat. This species is also found in ditches surrounding agricultural fields. This species is both federally and state “threatened” (CDFW, 2016). The species has designated critical habitat approximately 12 miles to the northeast of the Project Area. It is unlikely this species will be present in the Project Area due to the lack of recent observations and poor habitat quality.

California Red-legged Frog (*Rana draytonii*)

The California red-legged frog is largely restricted to coastal drainages on the Central Coast of California and in the Sierra foothills. They prefer still or slow moving water with emergent and overhanging vegetation. The Project Area does not provide suitable habitat due to incised channels and lack of significant adjacent wetlands. The Project Area is outside of the range of the California red-legged frog and the nearest critical habitat is more than 8 miles from the Project Area.

Fish

Chinook salmon require water temperatures between 42.5 and 57.5°F for successful spawning, egg incubation, and fry development, while optimal immigration and holding temperatures range from 46 to 52°F (NOAA, 2014). The preferred water temperature range for steelhead spawning is reported to be 30°F to 52°F (CDFW, 2000, as referenced in NOAA, 2014). As described in Section 3.2, *Water Quality*, low flow levels and large pools in Putah Creek lead to solar heating of stream flows and result in typical summer stream temperatures that exceed 68°F at Highway 505, are near or above 77°F at I-80, and continue to warm downstream (EDAW, 2005, pp. 5-11). In addition, high water temperatures limit the amount of dissolved oxygen (DO) that the stream can carry. Therefore DO also typically decreases as water flows downstream through the Project Area.

Fish migration into the Project Area from upstream is impeded by Monticello Dam and Putah Diversion Dam (PDD). Within the Project Area, there is a seasonal fish passage barrier downstream at Road 106A. Fish migration in the Project Area also is affected by seasonal obstructions caused by seasonal operation of the Los Rios Check Dam. The flashboards at this dam are removed typically on December 1st and installed on April 1st (Stillwater Sciences 2015, p. 13). Regulated, attraction pulse flows are timed to facilitate upstream migrations after the barrier is removed.

Steelhead – California Central Valley DPS (*Oncorhynchus mykiss*)

Central Valley steelhead, is a federally listed threatened species. Central Valley steelhead seasonally migrate from tributaries like Putah Creek, to the Sacramento River and out to the Pacific Ocean. Central Valley steelhead enter fresh water from August through April to spawn. The juvenile steelhead migrate to the ocean in the spring and early summer (NOAA 2014, p. 49). This species could be within the Project Area only for a very limited timeframe, specifically from December 1st, and will typically have exited the Project Area prior to the installation of the flashboards at the Los Rios Check Dam on April 1st. Although steelhead have been observed on the Yolo Bypass during flooding events, there has been no confirmed documentation of steelhead in Putah Creek since 1959, when the Monticello Dam was constructed. The species is unlikely to be present within the Project Area during Project activities.

Central Valley Fall-run Chinook salmon (*Oncorhynchus tshawytscha*)

Central Valley fall-run Chinook salmon are anadromous fish that migrate upstream as adults to spawn in freshwater streams, and migrate downstream as juveniles to physically develop in the ocean. This species is classified as SSC (CDFW, 2016). This species, while not abundant, are commonly found within the Project Area. Spawning, rearing, and migratory habitat is present within the Project Area and fall-run Chinook salmon occur in Putah Creek from fall through spring.

Pacific Lamprey (*Entosphenus tridentatus*)

The Pacific lamprey rears in freshwater before migrating to the ocean, where it grows to full size prior to returning to natal streams to spawn. This species is classified as a SSC (CDFW, 2016). Pacific lampreys have been reported to maintain small runs in Putah Creek (Moyle, 2002). Adults are expected to migrate upstream into the Project Area between December and early April, when the Los Rios Check Dam is open, and continue to migrate upstream to spawn between March and July. The larval stage (ammocoetes) and juveniles are expected to occur throughout the Upper Reach upstream of the Highway 505 bridge year-round, and may occur downstream of Highway 505 when water temperatures are suitable. Because Pacific lamprey have been documented within Putah Creek and may occur year-round, this species has a high occurrence potential within the Project Area.

Mammals

Western Red Bat (*Lasiurus blossevillii*)

The western red bat is a wide-ranging migratory bat species, common throughout western North America through Central America and into the northern regions of South America. The Central Valley is known to be an area of primary importance for breeding populations of western red bat; however, roosts have not been documented within the Project Area (Pierson et al., 2004). This species has a status of SSC under CDFW (CDFW, 2016). The western red bat has the potential to occur within the riparian forest habitat found within the Project Area.

Pallid Bat (*Antrozous pallidus*)

The Pallid Bat is found throughout Western North America, occupying a range of habitat including coniferous forests, rocky canyons, old farmland, and desert. In Northern California, Pallid bats are primarily found in oak woodland habitat (Bolster, 1998). This species has a status of SSC under CDFW (CDFW, 2016). The Pallid Bat may use riparian tree hollows as roosting habitat, and as such, has the potential to be present within the Project Area throughout all reaches.

Plants

Baker's Navarretia (*Navarretia leucocephala* ssp. *bakeri*)

Baker's navarretia is found in cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and vernal pools. This species is classified as "1B-rare, threatened, or endangered in California or elsewhere" by California Native Plant Society. The Project Area has suitable habitat for this species. However, during numerous surveys of the Project Area, this species has not been identified. This species is unlikely to be present within the Project Area.

Non-Special Status Species of Interest within the Project Area

Fish

As a result of temperature and dissolved oxygen patterns in Putah Creek, the fish community in the Project Area downstream of Pedrick Road (Olmo-Hammond-UC Davis Reach) is dominated by warm-water exotic species (TRPA 2010 as referenced in Stillwater Sciences, 2015, p. 16). Upstream of Pedrick Road, in the cooler reaches of the Project Area, the fish community is dominated by native species (TRPA, 2010, as

referenced in Stillwater Sciences, 2015, p. 16). Below are descriptions of a few native fish species of special interest found within the Project Area:

Hardhead (*Mylopharodon conocephalus*)

Hardhead are found within the Project Area, especially in the upstream reaches, west of I-80. This species feed on invertebrates, aquatic plants, or insects. This native species prefers warmer temperatures with low flow. This is not a special-status species.

Sacramento Blackfish (*Orthodon microlepidotus*)

Sacramento blackfish are a native species found within the Project Area, primarily in the western reaches, west of I-80. This species is found in warm turbid waters in small and large streams. This species prefer water between 72-82°F (UCDANR, 2015). This is not a special-status species.

Sacramento Sucker (*Catostomus occidentalis*)

The Sacramento sucker is a native species that is found within the Project Area, primarily in the western reaches, west of I-80. Suitable habitat consists of streams, lakes, and mild estuarine environments that have cool temperatures and moderate elevations. The species is found in pools, runs, and riffles with vegetation or rocks to provide cover from predators (UCDANR, 2015). This is not a special-status species.

Mammals

North American Beaver (*Castor canadensis*)

Observations of the North American beaver have been documented within the Project Area in the western reaches, upstream of the NAWCA/Mariani Reach. This species is semi-aquatic and prefers riparian areas with flowing water. North American beaver is not a special-status species.

North American River Otter (*Lontra canadensis*)

The North American river otter is a semiaquatic species found throughout North America. The species prefers habitat near water's edge such as rivers, lakes, swamps, coastal shoreline, tidal flats, or estuaries. This species has the potential to be present within the Project Area. North American river otter is not a special-status species.

Critical Habitat

The USFWS Critical Habitat Mapper does not identify any critical habitat for special-status species within or near the Project Area (USFWS, 2014). The nearest critical

habitat for any species is approximately 1.45 miles south of the Mace Road to Road 106A Reach. This area contains Colusa grass, Solano grass, and vernal pool tadpole shrimp critical habitat. Critical habitat for California red-legged frog is designated approximately 8.1 air miles to the southwest of the Project Area, approximately 10 miles upstream of Monticello Dam, in similar habitat to the upper reaches of Putah Creek (USFWS, 2014). Vernal pool tadpole and fairy shrimp critical habitat has been designated approximately 15 miles south of the Project Area, in a vernal pool complex separated from the Project Area by I-80 and developed agriculture lands.

Wildlife Corridors

Wildlife corridors refer to established migration routes commonly used by resident and migratory species for passage from one geographic location to another. Corridors are present in a variety of habitats and link undisturbed areas that would otherwise be fragmented. Maintaining the continuity of established wildlife corridors is important to sustain species with specific foraging requirements, preserve to species distribution potential, and retain diversity among wildlife populations. Therefore, wildlife corridors are considered a sensitive resource. The Project Area is an established wildlife corridor.

Biological Resources by Reach

General biological conditions for each Project reach are described below. Habitat types generally observed within the Project Area occur parallel to the channel and include aquatic, riparian, and terrestrial habitats. There are spatial variations in how much of each habitat type occurs in each reach, as described below. **Table 3.4-2** below lists the Project reaches in or near which the species listed above, and other notable species, such as giant garter snake, least Bells's vireo, and Baker's navarretia have been observed at some point in time and documented in the CNDDDB database.

NAWCA/Mariani

The NAWCA/Mariani reach begins immediately downstream of the Putah Diversion Dam (PDD). Tributaries to Putah Creek in this reach include McCune/Pleasant Creek, which enters the Project Area in the upstream third of the reach. Tributaries provide nutrients that benefit aquatic and riparian species within this reach and downstream. A broad floodplain has formed in the upstream-most section of the reach; following downstream, the channel narrows and becomes incised with increased riverine habitat. The reach has lateral biological connectivity that allows species and nutrient movement and increased riparian habitat values. The reach does not have any large pools. Because of its location at the base of the PDD, water temperatures are generally lower in this reach than in downstream reaches, providing suitable habitat for native fish species.

Native species, such as Sacramento sucker and Sacramento blackfish, have the potential to be present within this reach. No CNDDDB special-status species observations have been recorded within this reach. However, valley elderberry longhorn beetles (VELB) were observed directly adjacent to this reach along the PDD (CDFW 2015a). The VELB host plant, the blue elderberry, is found within this reach (Table 3.4-2), therefore, the beetle may occur in this reach. Pacific lamprey also has potential to be present within this reach.

Table 3.4-2 CNDDDB Species Observed By Reach

Reach	Valley Elderberry Longhorn Beetle	Swainson's Hawk	Western Pond Turtle	Giant Garter Snake	Least Bell's Vireo	Baker's Navarretia	White-Tailed Kite
NAWCA/Mariani							
Duncan – Giovannoni	✓		✓				
Winters Putah Creek Nature Park	✓	✓					
East of 505						✓ +/-	
Warren		✓					
Upper McNamara							
Lower McNamara							
MacQuiddy (Lester)							
Russell Ranch		✓					
Stevenson Bridge		✓					
Glide Ranch		✓					
Nishikawa							
Olmo-Hammond-UCD	✓						✓
I-80 to Old Davis Road		✓		✓			
Old Davis Road to Mace		✓		✓			
Mace to Road 106A		✓					
Road 106A to YBWA		✓				✓ +/-	

Note: +/- Observed near Project Area.
Source: CDFW, 2015a.

Duncan-Giovannoni

Dry Creek is a major tributary that enters this reach near the southwest corner of the City of Winters. A prior restoration on Dry Creek has stabilized its down-cutting and this

channel is now one of the leading contributors of sediment to naturally rebuild the floodplains (EDAW, 2005, pp. 4-24, Exhibit 4-4). This tributary delivers nutrients and provides habitat diversity, improving habitat for riparian and aquatic species in this reach and downstream reaches. This reach has approximately 5 acres of in-channel pools, 7 acres of mapped invasive weeds, and contains an adjacent wetland. The pools in the downstream areas of this reach have elevated water temperatures, creating habitat conditions favorable for non-native fish species, such as largemouth bass, over native fish species, such as Sacramento sucker and Sacramento blackfish, which depend on cooler waters.

Western pond turtles and valley elderberry longhorn beetles have been observed in this reach (CDFW, 2015a). Western pond turtles inhabit fresh or brackish water characterized by areas of deep water, low flow velocities, moderate amounts of riparian vegetation, warm water and underwater cover elements (Stillwater Sciences, 2015, pp. 36) (see Table 3.4-1). This reach supports some habitat for these species (see Table 3.4-2). Pacific lamprey also has potential to be present within the upstream sections of this reach because it contains cold-water habitat.

Winters Putah Creek Nature Park

Along the portion of this reach, a restoration project was undertaken to fill large pools and reconfigure the channel to improve habitat and flow conditions. The park has been revegetated with native plants (City of Winters, 2008, p.14).

CNDDDB documents observations of the western pond turtle and the Swainson's hawk within this reach (CDFW, 2015a). The Swainson's hawk requires large, sparsely vegetated flatlands characterized by valleys, plateaus, broad floodplains, and large open expanses (Bloom, 1980; Estep, 1989, as referenced in Stillwater Sciences, 2015, p. 37). This reach supports the habitat necessary for both of these species (Table 3.4-2). Native fish species, such as Pacific lamprey, Sacramento sucker and Sacramento blackfish, also have the potential to be present within this reach.

East of 505

The East of 505 Reach has no large pools. Approximately 2 acres of invasive weeds occur in this reach. Sacramento sucker and Sacramento blackfish have the potential to be present within this reach. Baker's navarretia was observed south of this reach near but outside of the Project Area (CDFW, 2015a). Baker's navarretia typically occurs in valley grasslands habitat, which does not exist in this reach (Stillwater Sciences, 2015, p. 19).

Warren, Upper McNamara, Lower McNamara

The Upper McNamara Reach has approximately 5 acres of pool habitat and approximately 4 acres of mapped invasive weeds. Lower McNamara has approximately 7 acres of pools and approximately 0.5 acres of mapped invasive weeds. The Warren Reach does not have any mapped pools. Native fish species, such as Sacramento sucker and Sacramento blackfish, have the potential to be present within these reaches. The Warren Reach contains one CNDDDB Swainson's hawk observation (CDFW, 2015a). This reach contains suitable habitat for this species (Table 3.4-2).

MacQuiddy (Lester)

This reach does not have any mapped pool habitat. No CNDDDB-listed observations have been documented within this reach. The absence of pools allows for lower water temperatures and provides suitable habitat for native fish species such as Sacramento sucker and Sacramento blackfish.

Russell Ranch

Russell Ranch Reach has approximately 7 acres of pools and approximately 2.8 acres of invasive weeds. Elevated water temperatures in this reach favor non-native fish species, such as largemouth bass. Multiple Swainson's hawk occurrences have been documented in this reach (CDFW, 2015a), which contains the habitat suitable for this species (Table 3.4-2).

Stevenson Bridge

There are some minor floodplain terraces on the southern edge of the Stevenson Bridge Reach. This reach has approximately 1.5 acres of pools and approximately 0.5 acres of mapped invasive weeds. The pools have elevated water temperatures that favor non-native fish species, such as largemouth bass. Multiple Swainson's hawk occurrences have been documented in this reach (CDFW, 2015a), which contains the habitat suitable for this species (Table 3.4-2).

Glide Ranch, Nishikawa

The Glide Ranch Reach has approximately 15 acres of pools and approximately 8 acres of mapped invasive weeds. The pools have elevated water temperatures that favor non-native fish species. The Nishikawa Reach reach does not have any mapped pools. Multiple Swainson's hawk occurrences have been documented in these reaches (CDFW, 2015a). These reaches contain habitat suitable for Swainson's hawk (Table 3.4-2).

Olmo-Hammond-UCD

In the upstream half of this reach, the creek is in an incised channel. On the north bank, somewhat east of the middle of the reach, a smaller side branch of the creek splits off along the north bank of the creek. This northern side branch, which runs through the southern edge of the campus of the University of California, Davis and then the City of Davis, is part of the historic channel of Putah Creek and, although not part of the Project Area, provides habitat for aquatic and riparian species near the Project Area. From this divergence point eastward, the main branch of the creek, including the Project Area, enters an engineered, leveed channel. The levees eliminate lateral connectivity, disconnecting the creek from a natural floodplain, which reduces nutrient movement, riparian width, and species diversity. The Olmo-Hammond-UC Davis Reach has approximately 17 acres of pools and approximately 2.5 acres of mapped invasive weeds. The pools in this reach have elevated water temperatures that favor non-native fish species, such as largemouth bass.

Multiple Swainson's hawk occurrences have been documented in this reach (CDFW, 2015a). A white-tailed kite observance is also recorded in this reach. The white-tailed kite prefers habitats within riparian corridors during both the breeding and non-breeding seasons (Ericksen, 1995, as referenced in Stillwater Sciences, 2015, p. 36). This reach contains habitat suitable for these species (nesting and foraging for Swainson's hawk, foraging for white tailed kite) (see Tables 3.4-1 and 3.4-2).

I-80 to Old Davis Road, Old Davis Road to Mace

These reaches are located within the engineered, leveed channel, which ends at Mace Boulevard/Road 104. The levees eliminate lateral connectivity, disconnecting the creek from the natural floodplain. This disconnect reduces species and nutrient movement and riparian width, thus reducing riparian habitat. There are no significant tributaries in these reaches. Both of these reaches are located in an area of flatter topography in which the channel is less incised than in the upstream reaches. The University of California, Davis, National Priority Listing (Superfund) site is northeast of the eastern edge of the I-80 to Old Davis Road Reach and directly north of the western end of the Old Davis Road to Mace Reach.

The I-80 to Old Davis Road Reach and the Old Davis Road to Mace Reach do not have mapped pools; however, due to their location at the lower end of the watershed following a number of large pools, and the lack of shading riparian canopy in most locations, these reaches have elevated water temperatures and are therefore likely to

support mainly non-native species, such as largemouth bass because of the low habitat quality.

Multiple Swainson's hawk occurrences have been documented in these reaches (CDFW, 2015a). A giant garter snake was also observed at the border of these reaches in 1976 by an undocumented source. Giant garter snake habitat consists of sloughs, canals, low-gradient streams, and freshwater marshes (Stillwater Sciences, 2015, p. C-6). These reaches contain suitable habitat for these species (see Tables 3.4-1 and 3.4-2).

Mace to Road 106A

At Road 106A, at the far eastern edge of the reach, an earthen push-up dam is constructed across the stream channel to impound water during the agricultural irrigation season every year. This blocks species migration and creates a pool in the reach. The Mace to 106A Reach has approximately 17 acres of pools and approximately 12.8 acres of mapped invasive weeds. The pools within the reach result in elevated water temperatures that favor non-native fish species, such as largemouth bass.

Multiple Swainson's hawk occurrences have been documented in this reach (CDFW, 2015a). This reach contains nesting and foraging habitat suitable for this species (Table 3.4-2).

Road 106A to Yolo Bypass Wildlife Area

The earthen push-up dam at Road 106A on the far western edge of the reach (the dividing line between this reach and the Mace to Road 106A reach) controls flows into this reach in the summer months. The channel has very stable water levels due to the impoundments caused by the barriers at each end (the Los Rios check dam also backs up water into this reach). These barriers block species migration and create a pool. The Road 106A to YBWA Reach has approximately 11 acres of pools and approximately 8 acres of mapped invasive weeds. The pools within the reach and upstream create elevated water temperatures that favor non-native fish species, such as largemouth bass. Shallow overbank flooding occurs in this area about one out of every three years. These flooding events alter habitat characteristics for brief periods, temporarily changing habitats from mixed riparian and ruderal grassland to open water.

Multiple Swainson's hawk occurrences have been documented in this reach (CDFW, 2015a). Least Bell's vireo was also observed just downstream of the reach on the Yolo Bypass Wildlife Area. This reach contains nesting and foraging habitat suitable for these species (see Tables 3.4-1 and 3.4-2).

Regulatory Setting

This section lists specific environmental review and consultation requirements and identifies permits and approvals that must be obtained from local, state, and federal agencies before implementation of the proposed Project.

Federal Regulations

The Project may be subject to a number of federal agency permits regarding biological resources. Regulations related to drainage, dredge and fill activities, stream flow, and other hydrological topics appear in Section 3.1, *Hydrology*. Regulations affecting fill of wetlands and other “Waters of the US” are addressed in Section 3.2, *Water Quality*. Other federal biological regulatory permits are summarized below.

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) (16 USC Section 1531), protects and facilitates recovery of federally listed threatened and endangered animal and plant species and their habitats from unlawful take. “Take” under ESA includes activities such as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The USFWS regulations define “harm” to include some types of “significant habitat modification or degradation.” “Harm” may include habitat modification “where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.” (*Babbitt v. Sweet Home Chapter of Communities for a Great Oregon* (1995) 515 U.S. 687, 691.) Section 7 of the ESA requires that federal agencies, in consultation with USFWS or the National Oceanic and Atmospheric Administration (NOAA) Fisheries, use their authorities to further the purpose of ESA and to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat. Section 10(a)(1)(B) allows non-federal entities to obtain permits for incidental taking of threatened or endangered species through consultation with USFWS or NOAA Fisheries.

Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC Sections 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 Code of Federal Regulations (CFR) Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR Section 21). If nests are found, they must remain protected during construction activities until the young birds have fledged, unless otherwise authorized by CDFW and/or USFWS.

Clean Water Act Sections 404 and 401

The objective of the Clean Water Act (33 U.S.C. Section 1251 et seq.) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

Section 404 of the Clean Water Act regulates activities that involve a discharge of dredge or fill material into waters of the United States. The Corps is responsible for issuing permits for discharges covered by Section 404, including most notably the filling of wetlands. The Corps emphasizes avoiding and minimizing impacts on wetlands where feasible. When impacts on wetlands cannot be avoided, compensatory mitigation is generally required as part of the Section 404 permit process to ensure that there is no net loss of wetlands values and functions.

Section 401 of the Clean Water Act is administered by the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards. Under Section 401, an applicant for a federal permit, such as a Section 404 permit to discharge dredge or fill material into waters of the United States, must obtain a “water quality certification” from the appropriate state agency stating that the permitted activity is consistent with the state’s water quality standards. The Central Valley Regional Water Quality Control Board (RWQCB) is the appointed authority for Section 401 compliance in the Central Valley.

State Regulations

California Endangered Species Act

Under the CESA, CDFW has the responsibility to maintain a list of endangered and threatened species (CDFGC Section 2070). CDFW also maintains a list of “candidate species,” which are species that CDFW formally notices as being under review for addition to the list of endangered or threatened species. CDFW holds regulatory authority over projects that could result in the “take” of any threatened, endangered or candidate species (CDFW, 2015b, p. 3). Pursuant to the CESA and CEQA, a lead agency reviewing any project within the state must determine whether state-listed endangered or threatened species may be present in the Project Area and determine whether the proposed Project may have a potentially significant impact on such species.

California Department of Fish and Wildlife

Streambed Alteration Agreement (Sections 1600-1607 of the CDFGC)

State, local public agencies and private entities are subject to Section 1600 *et seq* of the CDFGC, which governs any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the CDFW. Under section 1602, a discretionary Stream Alteration Agreement must be issued by the CDFW to the Project applicant prior to the initiation of construction activities within a streambed.

Section 1602 of the California Fish and Game Code requires that any person, governmental agency, or public utility (e.g., an entity) may not substantially divert or obstruct the natural flow of, or 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 may pass into any river, stream, or lake unless the CDFW receives a complete written notification and other agreement issuance criteria are met. Based on information contained in the notification form and a possible field inspection, the CDFW may propose reasonable modifications to the proposed activity in order to protect fish and wildlife resources. The notification requirement applies to any work undertaken within the bed, bank, and/or riparian zone, including any hydrologically connected wetlands, of a creek, stream, or lake.

Native Plant Protection Act

The Native Plant Protection Act (CDFGC Section 1900-1913) prohibits the taking, possessing, or sale within the state of any plants with a State designation of rare, threatened, or endangered (as defined by CDFW). An exception to this prohibition in the Act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify CDFW and give the agency at least 10 days to salvage the plants before they are destroyed.

Birds of Prey

Under Section 3503.5 of the CDFGC, it is “unlawful to take, possess, or destroy any birds in the orders of *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.” CDFW holds jurisdiction over such actions and requires projects to plan avoidance and minimization measures for these types of impacts (CDFW, 2015b, p. 3).

“Fully Protected” Species

California statutes also accord “fully protected” status to a number of specifically identified birds, mammals, reptiles, and amphibians. Section 3505 of the CDFGC makes it unlawful to “take” “any aigrette or egret, osprey, bird of paradise, goura, numidi, or any part of such a bird.” Section 3511 protects from “take” the following “fully protected bird” that was observed foraging at the proposed Project Area: white-tailed kite.

“Special Concern” Species

According to Section 15380 of the CEQA Guidelines, species of special concern should be included in an analysis of project impacts. Project-level impacts to listed species (rare, threatened, or endangered) are generally considered significant, thus requiring lead agencies to prepare an Environmental Impact Report to fully analyze and evaluate the impacts. In assigning “impact significance” to populations of *non-listed* species, an analysis may consider factors such as population-level effects, proportion of the taxon’s range affected by a project, regional effects, and impacts to habitat features.

Water Pollution Affecting Species

According to CDFGC Section 5650, “it is unlawful to deposit in, permit to pass into, or place where it can pass into the waters of the state” any substance or material deleterious to fish, plant life, or bird life, including non-native species. This provision includes application of herbicides that could result in pollution of “Waters of the State” impacting fish and wildlife resources (CDFW, 2015, p. 3).

Local Regulations

Solano County General Plan

The Solano County General Plan contains policies to protect and improve water quality, preserve wetlands, protect watersheds and aquifer recharge areas, and conserve riparian vegetation (County of Solano, 2008a, pp. RS-2 to RS-3). The General Plan also discusses special-status species within the County (County of Solano, 2008a, pp. RS-9 to RS-3).

The following goals and policies from the Resources Element of the Solano County General Plan are relevant to biological impacts:

Policy RS.P-1: Protect and enhance the county’s natural habitats and diverse plant and animal communities, particularly occurrences of special-status species, wetlands, sensitive natural communities, and habitat connections.

Policy RS.P-2: Manage the habitat found in natural areas and ensure its ecological health and ability to sustain diverse flora and fauna.

Policy RS.P-3: Focus conservation and protection efforts on high-priority habitat areas depicted in Figure RS-1.

Policy RS.P-4: Together with property owners and federal and state agencies, identify feasible and economically viable methods of protecting and enhancing natural habitats and biological resources.

Policy RS.P-5: Protect and enhance wildlife movement corridors to ensure the health and long-term survival of local animal and plant populations. Preserve contiguous habitat areas to increase habitat value and to lower land management costs.

Policy RS.P-6: Protect oak woodlands and heritage trees and encourage the planting of native tree species in new developments and along road rights-of-way.
(County of Solano 2008a, pp. pp. RS-11 and RS-12)

Solano County General Plan Priority Habitat Areas

Solano County Priority Habitat Areas map lists the western end of creek (approximately 8.1 miles upstream of the Project Area) as California Red-legged Frog Core Recovery Area. This recovery area is in the extreme northwestern corner of the county (County of Solano, 2008a, p. RS-9). Approximately 4.96 miles of the Project (between the fork of Putah Creek near Davis, California and Mace Boulevard) is defined as Giant Garter Snake Priority Conservation Area. These snakes use dense aquatic vegetation in freshwater marshes, oxbows, and backwaters of creeks as their primary habitat, though they can also be found in and adjacent to irrigation canals that support cattails and bulrushes (County of Solano, 2008a, p. RS-10). High Value Vernal Pool Conservation Areas are located approximately 18 miles south of the Project Area between the English Hills and I-505 (County of Solano, 2008a, p. RS-10).

These habitat areas are mapped in Figure RS-1 of the Solano County General Plan. The priority habitat areas were used to create the Resource Conservation Overlay shown in Figure RS-2 of the Solano County General Plan and discussed in the Land Use chapter of

the General Plan. The overlay indicates general locations of priority habitat and provides both opportunities and restrictions regarding the use of the underlying properties (County of Solano, 2008b, p. RS-11).

Yolo County General Plan

The Yolo County General Plan contains policies to protect enhance biological resources through the conservation, maintenance, and restoration of key habitat areas and corresponding connections that represent the diverse geography, topography, biological communities, and ecological integrity of the landscape (County of Yolo, 2009, p. CO-34).

The following goals and policies from the Resources Element of the Yolo County General Plan are relevant to biological impacts:

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 that 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 (e.g., Yolo County HCP/NCCP) to sustain or recover special-status species populations by preserving and enhancing habitats for special-status species.

Policy CO-2.5: Protect, restore and enhance habitat for sensitive fish species, so long as it does not result in the large-scale conversion of existing agricultural resources.

Policy CO-2.6: Cooperate with the Department of Fish and Wildlife in inventorying streams with spawning and rearing habitat, evaluating those streams' existing and potential habitat value, and determining current and potential fish population levels.

Policy CO-2.7: Encourage streamside property owners and appropriate public agencies to participate in fishery enhancement projects.

Policy CO-2.8: Encourage all public land management agencies to protect, restore, and enhance the fish habitat within their jurisdiction.

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-2.14: Ensure no net loss of oak woodlands, alkali sinks, rare soils, vernal pools or geological substrates that support rare endemic species, with the following exception. The 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-2.23: Support efforts to coordinate the removal of non-native, invasive vegetation within watersheds and replacement 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,

Policy CO-2.25: Support efforts to reduce water temperatures in streams for fish via habitat restoration (e.g., increase shading vegetation) and water management (e.g., 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-2.28: Balance the needs of aquatic and riparian ecosystem enhancement efforts with flood management objectives.

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-2.34: 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-2.37: 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 (e.g., nest sites, dens, spawning areas, 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 (e.g., nest sites, dens, spawning areas, 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 State 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.

Policy CO-2.42: Projects that would impact Swainson's hawk foraging habitat shall participate in the Agreement Regarding Mitigation for Impacts to Swainson's Hawk Foraging Habitat in Yolo County entered into by the CDFG and the Yolo County HIP/NCCP Joint Powers Agency, or satisfy other subsequent adopted mitigation requirements consistent with applicable local, State, and federal requirements. (County of Yolo, 2009, p. CO-34 to CO-40)

Yolo County General Plan Priority Habitat Area Goals and Policies

GOAL CO-2: Biological Resources. Protect and enhance biological resources through the conservation, maintenance, and restoration of key habitat areas and corresponding connections that represent the diverse geography, topography, biological communities, and ecological integrity of the landscape.

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 that contribute to sustainable landscapes connected to each other and to regional resources.(County of Yolo, 2009, p. C-34 to CO-35)

3.4.2 Significance Criteria

The following thresholds for measuring a project's environmental impacts are based on CEQA Guidelines Appendix G (OPR, 2013). For the purposes of this PEIR, impacts are considered significant if implementation of the proposed Project may result in any of the following:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local polices or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

An evaluation of the significance of potential impacts on biological resources must consider both direct effects to the resource, as well as indirect effects in a local or regional context. The loss of a biological resource or an obvious conflict with local, state,

or federal agency conservation plans, goals, policies, or regulations would generally be considered potentially significant impacts.

3.4.3 Impacts and Mitigation Measures

Impacts and mitigation measures are described below both generally and by reach. Applicable impacts and mitigation measures for each reach are summarized in Table 3.4-3, at the end of this section.

General Impacts and Mitigation Measures

Impact 3.4-1: General Impacts on Special-Status Species and Habitats.

The Project would reduce invasive plants and promote the growth of native wetland and riparian plants that would provide improved habitat for native plants and wildlife within the Project Area. However, Project construction could create general short-term adverse impacts to special-status species and habitats by directly disturbing special-status species or temporarily removing habitat during restoration activities within the Project Area. Mitigation Measure 3.4-1, along with the other mitigation measures listed below, would reduce this impact to **less than significant**.

Mitigation Measure 3.4-1: Worker Environmental Awareness Program (WEAP).

During construction of the Project, before any work occurs on the Project site, including grading, vegetation removal and equipment staging, all construction personnel shall participate in an environmental awareness training regarding special-status species and sensitive habitats present on the Project site. Any additional construction personnel that are employed following the initial start of construction shall receive the mandatory training before starting work. As part of the training, an environmental awareness handout shall be provided to all personnel that describes and illustrates sensitive resources (i.e., special-status species and habitat, nesting birds/raptors) to be avoided during proposed Project construction and lists measures to be followed by personnel for the protection of biological resources. Such measures shall include, but are not limited to:

- Procedures to follow if a special-status species is found within the work area.
- Checking under equipment and staging areas for wildlife species each morning prior to work.
- Staying within designated work areas.
- Maintaining exclusion/silt fencing.

- Reduced Project speed limits.
- No pets or firearms on-site.
- Contain trash/food waste and remove daily to avoid encouraging predators onto the Project site.
- Following Project Best Management Practices (BMPs).

Impact 3.4-2: Impacts on Western Pond Turtle.

The Project would benefit the western pond turtle by reducing invasive plants and promoting the growth of vegetated banks with log or rock basking sites that would provide increased and improved turtle habitat the Project Area. However, Project construction could create short-term adverse impacts to the western pond turtle by accidentally crushing them or otherwise directly harming them, and temporarily removing habitat during restoration activities within the Project Area. Mitigation Measure 3.4-2 would reduce this impact to **less than significant**.

Mitigation Measure 3.4-2: Western Pond Turtle Avoidance.

The western pond turtle shall be protected from Project Area staging and operations areas through monitoring by a qualified biologist. The Project Area shall be inspected daily for the presence of turtles. If necessary, with consultation with CDFW, barriers shall be used when needed to direct the turtles and move them to an area of suitable habitat outside of the construction activity.

Impact 3.4-3: Impacts on Giant Garter Snake.

Project implementation may result in long-term benefits to potential Giant Garter snake habitat by improving habitat quality through the restoration of degraded stream reaches and widening of the associated floodplain within the lower reaches of the Project Area. However, short-term direct (crushing) and indirect (temporary habitat loss) impacts from construction may occur to Giant Garter Snake in areas where there is potential habitat for this species. Mitigation Measure 3.4-3 would reduce potential construction-related impacts to **less than significant**.

Mitigation Measure 3.4-3: Giant Garter Snake Avoidance.

In areas that provide suitable habitat for giant garter snake, construction shall only occur during the active period for the snake, between May 1 and October 1. During the active period for giant garter snake direct mortality is lessened because snakes are

expected to actively move and avoid danger. Preconstruction surveys for the giant garter snake shall occur within 24 hours prior to ground disturbing activities. A survey of the Project Area should be repeated if a lapse in construction activity of two weeks or greater has occurred.

If a snake is encountered during construction, work shall stop within the vicinity of the snake and the USFWS will be contacted immediately. Only following receipt of USFWS approval shall giant garter snake be collected and transferred to the nearest suitable habitat outside the work area. Work shall not re-commence until a qualified biologist has either removed the snake from the construction area or, after thorough inspection, determined that the snake has vacated the construction area.

Any dewatering or vegetation clearing within 200 feet of potential aquatic habitat for giant garter snake shall be limited to the minimum amount necessary.

Impact 3.4-4: Impacts on Valley Elderberry Longhorn Beetle.

Project construction activities could adversely impact the Valley Elderberry Longhorn Beetle (VELB) by inadvertently harming or killing the VELB's host plant blue elderberry (*Sambucus nigra* ssp. *caerulea*) (BSK, 2015, p. 20). Project design proposes to avoid areas where elderberry shrubs naturally occur and Project Area-specific activities would include elderberry avoidance and protection in their design (BSK, 2015, p. 20). Biological clearances for Project activities would adhere to the applicable USFWS VELB guidance (USFWS, 1999). To provide additional protection for VELB habitat, Mitigation Measure 3.4-4 would require the Project to adhere to USFWS VELB guidance, thereby reducing the potential impact to **less than significant**.

Mitigation Measure 3.4-4: Valley Elderberry Longhorn Beetle (VELB) Avoidance).

Blue elderberry plants (with stems greater than 1-inch diameter at ground level) occurring within the Project Area shall be avoided and, if avoidance is not possible, relocated to a designated location. Where Project impacts to elderberry shrubs cannot be avoided, or where shrubs are located within 30.5 meters (100 feet) of Project Area-specific activities, activities shall be conducted according to USFWS Conservation Guidelines for VELB (1999), or other VELB guidance as updated by the USFWS.

VELB habitat shall be considered directly affected if Project construction requires the removal of the shrub or if ground-disturbing activities would occur within 6.1 meters (20 feet) of the dripline of the shrub. The species would be considered indirectly affected if

Project construction would disturb the ground between 6.1 and 30.5 meters (20 and 100 feet) from the dripline of the shrub (USFWS, 1999). Transplantation or temporary removal of the affected shrubs may be necessary as prescribed by the guidelines, but plants that are extremely difficult to remove may be exempted. Planting of additional seedlings or cuttings may be required under the Project or program USFWS Biological Opinion, depending on the number of elderberry shrubs with emergence holes present in the Project Area.

A monitoring plan of any mitigation measures in the Project Area shall be implemented as required under the Biological Opinion, including monitoring the general condition of the mitigation Project Area and the condition of the elderberry plantings for up to ten consecutive years. The plan shall describe monitoring responsibilities, intervals, intensity, and success rates. The monitoring plan shall further include requirements for reporting observations and findings to the applicable agency, for example, for VELB observations, to USFWS.

Impact 3.4-5: Impacts on Swainson’s Hawk.

The Project would support a transition from habitat that favors invasive plant species to one that favors native species and self-maintaining habitat. This would reduce invasive plants and promote the growth of native and shelterbelt vegetation that could provide habitat for Swainson’s hawk. However, the Project could adversely impact Swainson’s hawk if construction activities occurred during the breeding and nesting season, both directly (by physically disrupting breeding and nesting), and indirectly (if the noise and activity of construction discourages birds from utilizing otherwise suitable breeding and nesting habitat). Mitigation Measure 3.4-4 would reduce this impact to **less than significant**.

Mitigation Measure 3.4-5: Swainson’s Hawk Avoidance.

For any construction activities initiated between March 15 and September 1, surveys for nesting Swainson’s hawk shall be conducted within 0.5-mile of areas of disturbance for this species as described in the *Recommended Timing and Methodology for Swainson’s Hawk Nesting Surveys in the California’s Central Valley* (Swainson’s Hawk Technical Advisory Committee, 2000). The recommended minimum survey protocol is completion of surveys for at least the two survey periods immediately prior to a project’s initiation. Survey periods correspond to typical migration, courtship, and nesting behavior and defined as follows:

Survey Period	Survey Dates	Survey Time	Number of Surveys
1 Recommend optional	January 1 to March 20	All day	1
2	March 20 to April 5	Sunrise to 1000 or 1600 to sunset	3
3	April 5 to April 20	Sunrise to 1200 or 1630 to sunset	3
4 Initiating surveys is not recommended	April 21 to June 10	All day; Monitoring known nests only	Ongoing
5	June 10 to July 30	Sunrise to 1200 or 1630 to sunset	3

If surveys determine that the species is present and nesting within this area, a buffer zone of 0.5-mile shall be established and coordination with CDFW shall be required prior to any work in this buffer zone during the nesting season. Work within 0.5-mile may be permitted with CDFW approval if a qualified biologist monitors the nest when Project disturbance activities occur within 0.5-mile of the nest. If the monitor determines that construction may result in abandonment of the nest, all construction activities within 0.5-mile shall be halted until the nest is abandoned or all young have fledged. The monitor shall continue monitoring the nest until construction within 0.5-mile of the nest is completed, or until all chicks have completely fledged and are no longer dependent on the nest.

Impact 3.4-6: Impacts on Nesting Bird Species.

The Project would support an overall transition from habitat that favors invasive plant species to one that favors native species and self-maintaining habitat. This would reduce invasive plants and promote the growth of native and overhanging vegetation that could provide improved cover, foraging and nesting habitat for the song sparrow (Modesto population), western yellow-billed cuckoo, tricolored blackbird, white-tailed kite, and other migratory bird species. However, the Project could adversely impact bird species if construction activities occurred during the breeding season, both directly by physically disrupting breeding and nesting, and indirectly if the noise and activity of construction discourages birds from utilizing otherwise suitable breeding and nesting habitat. Mitigation Measure 3.4-6 would reduce this impact to **less than significant**.

Mitigation Measure 3.4-6: Nesting Bird Avoidance.

A pre-construction survey by a qualified biologist for nesting birds shall be required if construction activities are scheduled to occur during the breeding season (February 1 to August 31) for raptors and other migratory birds, including special-status bird species. The survey shall be conducted 15 days prior to ground disturbing activities and shall cover 500-foot radius surrounding the construction zone.

If active nests are found, actions typically include, but are not limited to, monitoring by agency-approved biologists, establishment or refinement of species-specific buffers, reduction or elimination of the use of loud equipment, reducing foot traffic and remaining in the vehicles, and the maintenance of visual screens. Migratory birds shall be protected from Project Area staging and operations through the use of a buffer established based on the birds sensitivity and response to the potential activity. Baseline behavior of the bird should be established to inform the buffer size. The qualified biologist may start with a 100-foot nest buffer or a 250-foot nest buffer for raptors, but may adjust the buffer size based of the reaction of the bird to the activity. If there is a potential for nest abandonment due to intrusion into the buffer zone, as established by the qualified biologist, then CDFW and the USFWS shall be consulted. If a lapse in Project-related work of 15 days or longer occurs, another focused survey, and if required, consultation with CDFW and the USFWS shall be performed before Project work can resume.

Impact 3.4-7: Impacts on Special-Status Bats.

Project construction has the potential to impact special-status bat species through the removal of large trees or snags that may be used as roosting habitat. Additionally, construction or demolition has the potential to disturb roosting individuals in the vicinity of the Project Area. Mitigation Measure 3.4-7 would reduce this impact to **less than significant**.

Mitigation Measure 3.4-7: Avoid and Minimize Impacts to Special-Status Bats.

In areas where suitable habitat occurs and there is potential for special-status bat species to be present, specific mitigation measure(s) will be developed in consultation with CDFW.

Impact 3.4-8: Impacts on Rare Plants.

The quality and extent of native riparian vegetation would increase through Project implementation. However, construction activities would involve large amounts of ground clearing and vegetation removal. In the long-term this would provide the benefit of increased habitat availability for rare and other native plant species, but could potential impact current populations. Mitigation Measure 3.4-8 would reduce these impacts to **less than significant**.

Mitigation Measure 3.4-8: Avoid and Minimize Impacts to Rare Plants.

Before the initiation of any vegetation removal or ground-disturbing activities, in areas that provide suitable habitat for special-status plants, the following measures shall be implemented:

- A qualified botanist shall conduct appropriately timed surveys for special-status plant species, in all suitable habitat that would be potentially disturbed by the Project.
- Surveys shall be conducted following CDFW- or other approved protocol.
- If no special-status plants are found during focused surveys, the botanist shall document the findings in a letter to the lead agency, and other appropriate agencies as needed, and no further mitigation will be required.
- If special-status plants are found during focused surveys, the following measures shall be implemented:
 - Information regarding the special-status plant population shall be reported to the CNDDDB.
 - If the populations can be avoided during Project implementation, they shall be clearly marked in the field by a qualified botanist and avoided during construction activities. Before ground clearing or ground disturbance, all on-site construction personnel shall be instructed as to the species' presence and the importance of avoiding impacts to this species and its habitat.
 - If special-status plant populations cannot be avoided, consultations with CDFW and/or USFWS would be required. If allowed under the appropriate regulations, the plants shall be mapped, photographed, and then transplanted to a suitable location by a qualified botanist. If required by the relevant agency, a plan to compensate for the loss of special-status plant species, detailing appropriate replacement ratios, methods for implementation, success criteria, monitoring and reporting protocols, and contingency measures that would be implemented

- if the initial mitigation fails; the plan would be developed in consultation with the appropriate agencies prior to the start of local construction activities.
- If mitigation is required, the Project proponent shall maintain and monitor the mitigation area for 5 years following the completion of construction and restoration activities. Monitoring reports shall be submitted to the resource agencies at the completion of restoration and for 5 years following restoration implementation. Monitoring reports shall include photo-documentation, planting specifications, a site layout map, descriptions of materials used, and justification for any deviations from the mitigation plan. Additional mitigation, monitoring may be required or modified by the administering agency, and those requirements would supersede this section.

Impact 3.4-9: Impacts on Riparian Habitat.

Project activities would, in the long-term, improve the quality and extent of riparian habitat and wildlife access to habitat by removing invasive vegetation and substantially increasing the total riparian area.

Since the primary habitat within the proposed Project Area is riparian habitat, and equipment would be operated within the riparian zone, short-term adverse impacts to riparian habitat would occur. These short-term impacts include removing, moving, or altering vegetation and the channel to enhance riparian habitat throughout the Project Area. Through the Project's conversion of pools to riffles, the habitat suitable for fish species should significantly increase as a result of channel improvements. The impacts to habitat from the restoration would be temporary, until new native vegetation establishes itself. Temporary loss of riparian habitat would last 1 to 3 years in the lower understory and 5 to 10 years for trees and shrubs.

Based on field observations by the Putah Creek streamkeeper, the temporary impacts would affect less acreage on an annual basis than the existing condition pattern of stream bank failures (which results in riparian vegetation disturbance) and loss of native riparian habitat due to invasive species. The Project's construction limits on individual Project reaches and lengths specifically address the need to minimize short-term riparian forest impacts from the Project. In the long term, the Project would enhance riparian habitat, resulting in a beneficial impact. However, impacts due to removal of vegetation during construction could result in a minor temporal loss of functions and values of riparian habitat. Mitigation Measure 3.4-9 would reduce these impacts to **less than significant**.

Mitigation Measure 3.4-9: Monitor Riparian Habitat.

In advance of construction, a Riparian Revegetation and Monitoring Plan shall be prepared for riparian areas which will describe the thresholds of revegetation success, monitoring and reporting requirements, and a description of the site-specific planting plan. The long-term ecological monitoring program described in the Plan will provide the basis for gauging the achievement of minimum performance standards. The Plan will describe a three-year riparian monitoring program that assesses the survival and health of on-site plantings. Appropriate performance standards may include, but are not limited to: an 80 percent survival rate of restoration tree and shrub plantings; absence of invasive plant species in restored areas; and self-sustaining conditions (i.e., plant viability without supplemental water) at the end of three years. The Plan will be submitted to the appropriate regulatory agencies for review and approval.

Impact 3.4-10: Impacts on Fish.

Project construction would temporarily increase erosion and sedimentation as described in Impact 3.1-1, in the Section 3.1, *Hydrology*, of this report. This could have adverse impacts to fish habitat, however these impacts would be mitigated to a less-than-significant level by implementation of Stormwater Pollution Prevention Plans (SWPPPs) and, where SWPPPs are not required, implementation of Mitigation Measure 3.1-1 in Section 3.1, *Hydrology*. In the long-term, the Project would likely decrease sediment levels in the creek by stabilizing unstable, sloughing banks. Improved sediment transport is one of the goals of the Project.

The Project is not expected to increase any current effects from existing mercury or boron on fish habitat. The Project is unlikely to have any effect on the concentration of boron, because the Project would not influence the creek's boron dynamics. The proposed Project actions are not expected to increase exposure of mercury to fish through grading or soil manipulation.

In the long term, the Project would improve habitat for native fish through the conversion of large, deep pools to smaller, shallower pools and riffles. This conversion would decrease water temperatures and increase dissolved oxygen, thus providing better habitat for native fish species. The proposed Project also would improve salmonid habitat through planting of native trees, which also would decrease water temperatures by increasing shading along Putah Creek. The cooler water temperatures and increased dissolved oxygen levels would increase habitat for salmonids and decrease habitat for invasive species such as largemouth bass.

Aquatic habitat would be temporarily impacted from construction activities, which could increase sedimentation and remove segments of habitat from availability to aquatic species, including special-status fish species during construction period (e.g., when channel is bypassed or piped). Construction impacts to salmonids would be avoided due to the summer work window for in-water work, when water temperatures would be too high for them to be present. Measure 3.4-10 would reduce construction impacts on aquatic habitat to a **less-than-significant** level.

In the long-term, the Project would convert open water habitat, primarily pools, to transitional floodplain and riparian habitat. Converting these pools would reduce the habitat available for warm-water aquatic species and likely also reduce algal mats. These changes would reduce habitat for non-native aquatic species and improve habitat for native species.

Additionally, the Project could remove the seasonal earthen barrier between the Mace to Road 106A Reach and the Road 106A to Yolo Bypass Wildlife Area Reach and replace it with a non-sediment-based barrier, such as operable gates and a bridge. This would improve fish passage through the Project Area. In the long term, the Project would result in improved aquatic habitat for special-status fish species.

Mitigation Measure 3.4-10: Implement Aquatic Habitat Protection.

Aquatic habitat shall be protected during Project Activities by limiting the amount of in-channel work and acquiring proper permits for work done within aquatic habitats. A fence shall be installed to the extent necessary to prevent the unintended discharge of excavated material and turbid water. The fencing shall be checked regularly and maintained until construction is complete. If needed, fish salvage shall be performed under the direct supervision of an approved biologist to avoid incidental take from Project activities. Following installation of any water diversion structures, and prior to placement of fill, the approved biologist shall perform surveys for any fish in the Project Area, collect, and transfer native fish, including Pacific lamprey, to the nearest suitable habitat to the work area. During holding and transportation, fish would be held in stream water collected from the Project reach.

- Before removal and relocation begins, the approved biologist, in consultation with the appropriate agencies, shall identify the most appropriate release location(s). Release locations should offer ample habitat for Pacific lamprey and other native fish and should be selected to minimize the likelihood of reentering the work area.

- Relocation activities shall be performed during the morning when temperatures are coolest. Air and water temperatures would be periodically measured during dewatering activities to ensure native fish that may be present are protected.
- If Pacific lamprey are relocated, the following procedure shall be used:
 1. Handling of fish would be minimized. However, when handling is necessary, hands and nets would be wetted prior to handling.
 2. Any handled fish would be immediately placed in an aerated container with a lid in cool, shaded water. Aeration would be provided with a battery powered external bubbler. Fish would not be held more than 30 minutes.
 3. All handled fish would be moved directly to the nearest suitable habitat in the creek, as identified above.

Impact 3.4-11: Impacts on Wetland Habitats.

A wetland delineation report was prepared to determine the wetland boundaries within the Project Area (BSK, 2015a). Project construction activities would have direct and indirect impacts to wetlands, including potential disturbance to existing vegetation and soils.

Over the long term, impacts to wetlands would be mitigated through the conversion of low-quality and function wetlands to high-quality and function wetlands. In other words, although there would be a loss in Project Area total acres of low-value wetland, consisting of small wetland features within the channel, the Project would increase the acreage of high-value wetlands. Approximately 20 to 25 percent of current open-water river (pool) area would be converted to high-quality riverine emergent wetland. Low-value wetlands that are now overrun with invasive non-native plant species such as arundo and Himalayan blackberry would be converted to high-value wetlands occupied by primarily native wetland plant species. Therefore, the Project would have a **less-than-significant** impact on wetland habitats and no mitigation is required.

Impact 3.4-12: Impacts on Wildlife Corridors and Movement in the Project Area.

The proposed Project would restore and enhance habitat for native or migratory corridor species. Project construction could result in short-term disturbance and habitat removal. Resident and migratory species such as North American beaver and North American river otter may be present within the Project Area. These species are protected under the CDFGC (CDFW, 2014). Beaver can only be taken under license (CDFGC, Section 463), all take is prohibited for river otter (CDFGC, Section 460).

The Project could temporarily disturb and reduce wildlife migration and movement. However, the impact to these species would be temporary and reduced to **less than significant** with the implementation of Mitigation Measures 3.4-1 through 3.4-11.

Mitigation Measure 3.4-11: Native or Migratory Fish or Wildlife Species Avoidance.

The Native or Migratory Fish and Wildlife Species, such as North American beaver, North American otter, and other protected species shall be protected from Project staging and operations impacts through monitoring by a qualified biologist. Prior to construction, the Project Area shall be inspected for the presence of these species. If necessary, with consultation with CDFW, appropriate measures shall be taken to avoid and minimize Project impacts to these species. Additional specific measures to protect native or migratory wildlife species, may be required by CDFW under the 1600 series permit for the Project and shall be adhered to by the Project proponent.

Impact 3.4-13: Impacts on Biological Resources from Herbicide Use.

As described in Chapter 2, *Project Description*, herbicides approved by the California Department of Pesticide Regulation may be used in accordance with their labels as part of Project activities to reduce invasive weed species. As described in Section 3.2, *Water Quality*, herbicides that may be used include glyphosate, triclopyr, imazapyr, aminopyralid, chlorsulfuron, dithiopyr, and isoxaben. Some form of chemical weed control would be used in every Project reach for maintenance (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control).

Following the recommendations of the CDFW, this section includes a discussion of environmental chemistry of herbicides that may be used as part of Project activities and their potential effects (CDFW, 2015, p. 3). Potential Project herbicide impacts specifically related to water quality are discussed in Section 3.2, *Water Quality*.

Glyphosate

This herbicide is among the most widely used in the U.S. and is of relatively low oral and dermal acute toxicity and has not been found to cause mutations (NPIC, 2015). Glyphosate residue in plants and animals has been well studied, and studies indicate that plant uptake of glyphosate from soil is limited (NPIC, 2015).

Environmental Fate and Ecological Risks

Glyphosate is not expected to move vertically below the 6-inch soil layer and residues are expected to be immobile in soil. Glyphosate accidentally over-sprayed on the water may contaminate surface waters because it would not be broken down readily by water or sunlight. US EPA has determined that the effects of glyphosate on birds, mammals, fish and invertebrates are minimal, but glyphosate may cause adverse effects to non-target terrestrial plants (US EPA, 1993, p. 4.). Thus, Project use of glyphosate would not be expected to significantly affect birds, mammals, fish, and invertebrates in the Project Area, but would be expected to harm any plants sprayed, including those sprayed inadvertently. Consequently, Project use of glyphosate could adversely impact elderberry plants.

For Project purposes, target plants would include arundo, eucalyptus, fennel (*Foeniculum vulgare*), Himalayan blackberry, pampas grass (*Cortaderia* spp.), milk thistle, perennial pepperweed, tree-of-heaven, tree tobacco (*Nicotiana glauca*), vinca (*Vinca major*), Virginia creeper (*Parthenocissus quincifolia*), and yellow starthistle. Glyphosate would also be used in Project activities as a pre-emergent control for winter annual weeds (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control).

Mitigation Measure 3.4-12, below, would require all Project use of glyphosate to be applied only to target plants by a licensed applicator in accordance with label directions and US EPA recommendations (US EPA, 1993). Licensed applicators are required by law to avoid applying herbicides to non-target organisms. Additionally Mitigation Measure 3.4-11 forbids herbicide use within 100 feet of blue elderberry plants and specifies that herbicides shall be applied only to target plants.

No mitigation is needed for organisms other than plants given that glyphosate's toxicity to birds, mammals, fish and invertebrates is minimal (US EPA, 1993, p. 4). Therefore, after mitigation, potential Project impacts related to use of glyphosate would be reduced to **less than significant**.

Triclopyr

Triclopyr is used as a selective herbicide to control broad leaf weeds on a variety of sites (US EPA, 1998, p. 1). Environmental risks are discussed below.

Environmental Fate and Ecological Risks

Triclopyr is somewhat persistent and is mobile in the environment. In water, triclopyr primarily breaks down through exposure to light (photodegradation). In soil, triclopyr

primarily breaks down through microbial processes. Triclopyr is practically non-toxic to mammals and insects. Different triclopyr products have varying levels of toxicity to bird and fish species. Triclopyr TEA is practically non-toxic to slightly toxic to birds and estuarine/marine invertebrates and practically non-toxic to freshwater fish, freshwater invertebrates, and estuarine/marine fish. Testing of triclopyr BEE indicates it is slightly toxic to birds, moderately toxic to highly toxic to freshwater fish and estuarine/marine invertebrates, slightly to moderately toxic to freshwater invertebrates, and highly toxic to estuarine/marine fish. US EPA notes that flowing water systems would result in rapid dissipation of triclopyr (US EPA, 1998, pp. 4-5.) Thus, Project use of triclopyr would be expected to not significantly affect birds and mammals, and invertebrates in the Project Area, but would be expected to harm any plants or freshwater fish sprayed, including those sprayed accidentally. Consequently, Project use of triclopyr could adversely impact elderberry plants and freshwater fish.

For Project purposes, target plants would include almond (*Prunus dulcis*), black locust (*Robinia pseudoacacia*), catalpa (*Catalpa bignoniodes*), edible fig (*Ficus carica*), English ivy (*Hedera helix*), pepper tree (*Shinus molle*), tamarisk, tree-of-heaven, and tree tobacco (*Nicotiana glauca*) (see Chapter 2, *Project Description*, Table 2-1, *Invasive Weed Control*).

Mitigation Measure 3.4-12, below, would require all Project use of triclopyr to be applied only to target plants by a licensed applicator in accordance with label directions and US EPA recommendations to avoid spray drift to prevent toxicity to non-target organisms (US EPA, 1998). Licensed applicators are required by law to avoid applying herbicides to non-target organisms. Additionally Mitigation Measure 3.4-12 forbids herbicide use within 100 feet of blue elderberry plants and specifies that herbicides shall be applied only to target plants. The measure also forbids use of triclopyr in open water and wetland areas.

Because of triclopyr's low toxicity to mammals, birds, and insects, no mitigation is needed for these organisms. Therefore, after mitigation, potential Project impacts related to use of triclopyr would be reduced to **less than significant**.

Imazapyr

Environmental Fate and Ecological Risks

Imazapyr is non-volatile, persistent, mobile in soil, and can move via runoff to surface water and to leach to groundwater. Imazapyr breaks down in the environment only

through photolysis (breakdown by photons, including visible light, ultraviolet light, x-rays and gamma rays). Imazapyr is not expected to bioaccumulate in aquatic organisms (US EPA, 2006, p. 17).

US EPA does not consider imazapyr a risk to terrestrial birds, mammals, bees, fish, aquatic invertebrates, and aquatic non-vascular plants. US EPA is uncertain regarding imazapyr risks to estuarine/marine fish and invertebrates, due to an absence of toxicity data to observe long-term effects, but US EPA assumes that these organisms face no risk, similar to freshwater fish and invertebrates. However, US EPA does consider imazapyr a risk to non-target terrestrial plants and aquatic vascular plants, and a potential risk to federally listed threatened and endangered species, including aquatic vascular plants, terrestrial and semi-aquatic monocots and dicots (US EPA, 2006, pp. 1, 18).

Imazapyr is mainly used in aquatic and semi-aquatic weed control to control nuisance and non-native weed species along shoreline areas of lakes, streams, or canals. Because imazapyr has no effect on submerged aquatic vegetation (SAV), it can be used in margin or shoreline areas to control weeds without the risk of damaging desirable SAV (US EPA, 2006, p. 33.) Thus, Project use of imazapyr would be expected to not significantly affect birds, mammals, bees, fish, aquatic invertebrates, and aquatic non-vascular plants in the Project Area, but would be expected to harm any terrestrial plants sprayed, including those sprayed accidentally. Consequently, Project use of imazapyr could adversely impact elderberry plants.

For Project purposes, target plants include almond, black locust, catalpa, English ivy, pepper tree, and tree-of-heaven (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control).

Mitigation Measure 3.4-12, below, requires all Project use of imazapyr to be applied only to target plants by a licensed applicator in accordance with label directions and US EPA recommended methods to minimize potential risk to non-target organisms (US EPA, 2006). Licensed applicators are required by law to avoid applying herbicides to non-target organisms. Additionally, Mitigation Measure 3.4-12 forbids herbicide use within 100 feet of blue elderberry plants.

Because of imazapyr's low toxicity to birds, mammals, bees, fish, aquatic invertebrates, and aquatic non-vascular plants, no mitigation is needed for these organisms. Therefore,

after mitigation, potential Project impacts related to use of imazapyr would be reduced to **less-than-significant**.

Aminopyralid

This herbicide could be used for control of milk thistle and yellow starthistle (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control). It is particularly effective for yellow starthistle control (US EPA, 2005a, p. 20).

Environmental Fate and Ecological Risks

The primary way aminopyralid breaks down is by photolysis. Aminopyralid photolyzes moderately slowly in soils and is likely to be non-persistent and relatively immobile in the field (US EPA, 2005a, p. 6). Aminopyralid has been shown to be practically non-toxic to birds, fish, honeybees, earthworms, and aquatic invertebrates, but is slightly toxic to eastern oyster, algae, and aquatic vascular plants. Aminopyralid is not expected to bioaccumulate in fish tissue. The herbicide poses no acute or chronic risks to non-target endangered or non-endangered fish, birds, wild mammals, terrestrial and aquatic invertebrates, algae, or aquatic plants (US EPA, 2005a, p. 7). US EPA notes that compared to alternative herbicides, aminopyralid is less likely to impact terrestrial and aquatic plants (US EPA, 2005a, p. 20). Thus, Project use of aminopyralid would be expected to not significantly affect fish, birds, mammals, honeybees, earthworms, and aquatic invertebrates in the Project Area. Project use of aminopyralid could adversely impact elderberry plants if they were inadvertently sprayed.

For Project purposes, target plants include milk thistle and yellow starthistle (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control).

Mitigation Measure 3.4-12, below, requires all Project use of aminopyralid to be applied only to target plants by a licensed applicator in accordance with label directions and with US EPA recommendations to apply aminopyralid using hand-spray and spot treatments only (US EPA, 2005a, p. 19). Licensed applicators are required by law to avoid applying herbicides to non-target organisms. Additionally Mitigation Measure 3.4-12 forbids herbicide use within 100 feet of blue elderberry plants.

Because of aminopyralid's low toxicity to fish, birds, mammals, honeybees, earthworms, and aquatic invertebrates, no mitigation is needed for these organisms. Therefore, after mitigation, potential Project impacts related to use of aminopyralid would be reduced to **less-than-significant**.

Chlorsulfuron

This herbicide would be used for control target species, such as perennial pepperweed (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control).

Environmental Fate and Ecological Risks

US EPA conducted a screening level ecological risk assessment to determine the potential impact of chlorsulfuron use on non-target terrestrial and aquatic organisms. The assessment concluded that ecological risks are below the level of concern, with the exception of non-target plants. To minimize potential risk to non-target plants, US EPA requires that chlorsulfuron be applied to minimize spray drift. Adherence to the strict use restrictions on the labels for all chlorsulfuron products would substantially reduce, though not completely eliminate, risks to non-target plants (US EPA, 2005b, p. 5). Thus, Project use of chlorsulfuron would not be expected to significantly affect terrestrial and aquatic organisms in the Project Area, but would be expected to harm any terrestrial plants sprayed, including those sprayed accidentally. Consequently, Project use of chlorsulfuron could adversely impact elderberry plants.

Mitigation Measure 3.4-12, below, requires all Project use of chlorsulfuron to be applied only to target plants by a licensed applicator in accordance with label directions and to minimize spray drift. Licensed applicators are required by law to avoid applying herbicides to non-target organisms. Additionally, Mitigation Measure 3.4-12 forbids herbicide use within 100 feet of blue elderberry plants and specifies that herbicides shall be applied only to target plants.

Because of chlorsulfuron's low toxicity to terrestrial and aquatic organisms, no mitigation is needed for these organisms. Therefore, after mitigation, potential Project impacts related to use of chlorsulfuron would be reduced to **less-than-significant**.

Dithiopyr

This herbicide could be used as a pre-emergent control for winter annual weeds (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control).

Environmental Fate and Ecological Risks

Toxicological data indicates that dithiopyr is of low acute toxicity to mammals and has little to no potential for groundwater contamination. It is non-mutagenic and does not appear to be a developmental toxicant (US EPA, 1991, p. 2). In water, dithiopyr appears to break down through photodegradation, but dithiopyr does not photodegrade in soil (US EPA, 1991, p. 2). Dithiopyr is not very mobile in soil and residues do not persist

beyond the growing season. Surface water contamination from soil containing the herbicide is to be expected. Dithiopyr has low toxicity to mammals and is practically non-toxic to birds, but is highly toxic to freshwater fish and aquatic invertebrates (US EPA, 1991, pp. 7-8). US EPA has concluded that use of dithiopyr according to its registered use pattern is unlikely to pose a hazard to endangered aquatic and avian species, but may pose a hazard to endangered plant species from runoff and movement from treated areas (US EPA, 1991, p. 8). Thus, Project use of dithiopyr would not be expected to significantly affect mammals, birds in the Project Area, but would be expected to harm any terrestrial plants sprayed, including those sprayed accidentally. Consequently, Project use of chlorsulfuron could adversely impact elderberry plants. If dithiopyr were allowed to runoff and migrate from treated areas, Project use of dithiopyr would also be expected to significantly affect freshwater fish and aquatic invertebrates in the Project Area.

Dithiopyr would be used in Project activities as a pre-emergent control for winter annual weeds (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control). Mitigation Measure 3.4-12, below, requires all Project use of dithiopyr to be applied only to target plants by a licensed applicator in accordance with label directions and US EPA recommendations to minimize potential harm to non-target organisms (US EPA, 1991). Mitigation Measure 3.4-12 also forbids herbicide use within 100 feet of blue elderberry plants, and specifies that herbicides shall be applied only to target plants.

Mitigation Measure 3.4-12 also forbids use of dithiopyr in or near water due to its toxicity to fish. Additionally, licensed applicators are required by law to avoid applying herbicides to non-target organisms, therefore Mitigation Measure 3.4-12 would avoid herbicide application to non-target organisms during Project activities. Therefore, after mitigation, potential Project impacts related to use of dithiopyr would be reduced to **less-than-significant**.

Isoxaben

This herbicide is classified as low toxicity; it causes eye irritation and is harmful if inhaled (WSDOT, 2006, p. 1). It is considered practically non-toxic to mammals and birds, but its toxicity to fish and aquatic invertebrates has not been identified (WSDOT, 2006, p. 2).

Environmental Fate and Ecological Risks

Microbes and sunlight break down isoxaben, and the herbicide has a low potential to leach to groundwater. The herbicide is highly persistent in soil but breaks down quickly

in water. Isoxaben does not bioconcentrate (build up) through the food chain (WSDOT, 2006, pp. 2-3).

Mammals and birds can be directly exposed to isoxaben herbicide residues through their skin or eyes or when they inhale vapors or particulates. They can be indirectly exposed by eating contaminated prey or vegetation. However, at typical application rates of 1.0 pound per acre per year as a broadcast treatment, isoxaben is considered to pose an insignificant risk to mammals. (WSDOT, 2006, pp. 1, 3.) Thus, Project use of isoxaben is not considered likely to result in significant impacts to mammals and birds in the Project Area, including to song sparrow, Swainson's hawk, white-tailed kite, and western pond turtle.

Fish and aquatic insect exposure to isoxaben occurs primarily through direct contact with contaminated surface waters and sediment, and extra precautions are taken when using isoxaben near open water, wetlands, and wellhead protection zones. Contamination could result from application drift, rainfall runoff, or residue leaching through the soil into groundwater. Because isoxaben breaks down quickly in water, it is expected that exposure to fish and aquatic invertebrates would be limited (WSDOT, 2006, pp. 3-4). Because isoxaben's toxicity to fish and aquatic invertebrates has not been identified, it could pose a risk of impacts to fish and aquatic invertebrates in the Project Area.

Isoxaben would be used in Project activities as a pre-emergent control for winter annual weeds (see Chapter 2, *Project Description*, Table 2-1, Invasive Weed Control). To minimize exposure to fish and aquatic invertebrates, Mitigation Measure 3.4-12 forbids application of isoxaben to water, to areas where surface water is present, to wetlands, or to intertidal areas below the mean high water mark. Additionally, licensed applicators are required by law to avoid applying herbicides to non-target organisms.

Mitigation Measure 3.4-12 below would require all Project use of isoxaben to be applied only by a licensed applicator in accordance with label directions and regulatory agency recommendations to control spray drift and minimize potential harm to non-target organisms (WSDOT, 2006). Mitigation Measure 3.4-12 forbids herbicide use within 100 feet of blue elderberry plants.

Because isoxaben is non-toxic to mammals and birds, no mitigation is needed for these organisms. Therefore, after mitigation, potential Project impacts related to use of isoxaben would be reduced to **less-than-significant**.

Mitigation Measure 3.4-12: Implement Herbicide Protective Actions.

During all Project activities, herbicides shall only be used by a licensed applicator and shall be applied only to target plants. Herbicides shall not be used within 100 feet of blue elderberry plants.

In order to avoid and minimize impacts related to herbicide use, use any herbicides during Project activities in accordance with all directions and protective actions listed on the product label of the herbicide being applied.

In addition, take the following actions to ensure protection of fish, plant, and bird life during use of the herbicides listed below:

Glyphosate:

- a. Implement the following US EPA recommendations during Project activities (US EPA, 1993):
 - i. For non-aquatic uses, do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters and rinsate.
 - ii. For aquatic uses, only end-use products that are registered for aquatic uses. Do not contaminate water when disposing of equipment washwaters and rinsate. Treatment of aquatic weeds can result in oxygen loss from decomposition for dead plants. This loss can cause fish kills.

Triclopyr:

- a. As recommended by US EPA, avoid spray drift to prevent toxicity to non-target plants during Project activities (US EPA, 1998).
- b. Do not apply to open water or wetland areas to prevent toxicity to freshwater fish.

Imazapyr:

- a. Implement the following US EPA recommendations during Project activities (US EPA, 2006):

- i. If groundborne application is performed, take the following precautions to minimize potential risk to non-target terrestrial plants, aquatic vascular plants, and threatened and endangered species (US EPA, 2006, p. 33):
 - Use a nozzle height below 4 feet above the ground or plant canopy and coarse or coarser droplet size. (ASABE S572) or, if specifically using a spinning atomizer nozzle, use a volume mean diameter (VMD) of 385 microns or greater.
 - Do not apply with wind speeds greater than 10 mph.
 - Do not apply into temperature inversions.
- b. To minimize potential risk to aquatic vascular plants, do not apply to bodies of water or portions of bodies of water where emergent and/or floating weeds do not exist (US EPA, 2006, p. 32-33).

Aminopyralid:

- a. In addition to following all directions and protective actions listed on the product label, apply aminopyralid using hand-spray and spot treatments only (US EPA, 2005a, p. 19).

Chlorsulfuron:

- a. To minimize potential harm to non-target plants, implement the following US EPA recommendations during Project activities (US EPA, 2005b, p. 6):
 - i. Employ measures to control spray drift.
 - ii. Restrict use to only one application per growing season.

Dithiopyr:

- a. Do not apply dithiopyr in or near water due to its toxicity to fish.
- b. To minimize potential harm to non-target plants, implement the following US EPA recommendations during Project activities (US EPA, 1991, p. 8):
 - i. Do not apply dithiopyr aerially.

Isoxaben:

- a. To minimize exposure to fish and aquatic invertebrates, implement the following actions (WSDOT, 2006, p. 3):

- i. Do not apply directly to water, to areas where surface water is present, to wetlands, or to intertidal areas below the mean high water mark.
- ii. Employ measures to control spray drift.
- iii. Do not contaminate water when disposing of equipment washwaters and rinsate.

Project Area-Specific Impacts and Mitigation Measures

NAWCA/Mariani

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, Valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Duncan-Giovannoni

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the Valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through and 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Winters Putah Creek Nature Park

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through

potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved.

Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

East of 505

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long-term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved.

Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Warren, Upper McNamara, Lower McNamara

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 and 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

MacQuiddy (Lester)

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be less-than-significant with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Russell Ranch

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through

potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Stevenson Bridge

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the

channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

*Glide Ranch, Nishikawa*Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be less-than-significant with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once Project construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Olmo-Hammond-UCD

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

*I-80 to Old Davis Road, Old Davis Road to Mace*Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, giant garter snake, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less-than-significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Mace to Road 106A

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the Valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be less-than-significant with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long-term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Road 106A to Yolo Bypass Wildlife Area

Special-Status Species

As described in Impacts 3.4-1 through 3.4-13, development of the proposed Project would result in temporary disturbance of the Project Area that could support special-status wildlife species, such as federal and California threatened or endangered species of special concern, including the valley elderberry longhorn beetle, Swainson's hawk, and the western pond turtle. Herbicide use during Project activities could impact elderberry plants that may be present within the Project Area. Implementation of Mitigation Measures 3.4-1 through 3.4-12 would reduce this impact to a **less-than-significant** level.

Riparian Habitat

As described in Impact 3.4-9, in the long-term, riparian habitat within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities would occur, through removing, moving, or altering the vegetation and the channel to enhance riparian habitat throughout the Project Area. This impact would be reduced to a **less-than-significant** level by Mitigation Measure 3.4-9.

Fish Habitat

As described in Impact 3.4-10, in the long-term, aquatic habitat within the Project Area would be converted from open water habitat, to transitional floodplain and riparian habitat as part of the Project. Short-term Project construction activities could have direct and indirect impacts to aquatic habitat, through potential disturbance to existing vegetation, soils, and species. Short-term impacts would be **less than significant** with the implementation of Mitigation Measure 3.4-10. In the long term, these impacts to aquatic habitat would be self-mitigated through the conversion of low quality open water aquatic habitat to high quality and high function riparian habitat.

Wetlands

As described in Impact 3.4-11, in the long-term, riverine wetlands within the Project Area would be enhanced and restored as part of the Project. Short-term Project construction activities could have direct and indirect impacts to wetlands, through potential disturbance to existing vegetation and soils. Over the long term, impacts to wetlands would be self-mitigated through the conversion of low quality wetlands to high quality and high function wetlands. Therefore, there would be a **less-than-significant** impact to wetlands.

Species Movement

As described in Impact 3.4-12, the Project may temporarily interfere with the movement of species within the Project Area, including Song sparrow (Modesto population), Swainson's hawk, valley elderberry longhorn beetle, western pond turtle, and white-tailed kite. Resident species such as the North American beaver, North American river otter, and fish species such as hardhead and others' movement may also be temporarily interfered, due to Project activities. This impact would only occur during Project construction activities. Once construction is completed, species movement would be improved. Mitigation Measure 3.4-11 would prevent any significant impacts on species movement during Project activities. This potentially significant impact would be reduced to a **less-than-significant** level with mitigation.

Herbicides

Herbicide use in the Project Area could adversely impact freshwater fish and non-target plants, including elderberry. Implementation of Mitigation Measure 3.4-12 would reduce potentially significant impacts from herbicide use to a **less-than-significant** level.

Table 3.4-3 Summary of Biological Resources Impacts and Mitigation Measures

Reach	Impact 3.4-1: Special-Status Species and Habitats	Impact 3.4-2: Western Pond Turtle	Impact 3.4-3: Giant Garter Snake	Impact 3.4-4: Impacts on Valley elderberry longhorn beetle (VELB)	Impact 3.4-5: Impacts on Swainson’s Hawk	Impact 3.4-6: Impacts on Nesting Birds	Impact 3.4-7: Impacts on Special-Status Bats	Impact 3.4-8: Impacts on Rare Plants	Impact 3.4-9: Impacts on Riparian Habitat	Impact 3.4-10: Impacts on Fish	Impact 3.4-11: Impacts on Wetland Habitats	Impact 3.4-12: Impacts on Wildlife Movement	Impact 3.4-13: Impacts on Biological Resources from Herbicide Use	Applicable Mitigation Measures
NAWCA/Mariani	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Duncan-Giovannoni	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Winters Putah Creek Nature Park	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
East of 505	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Warren	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-11
Upper McNamara	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Lower McNamara	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
MacQuiddy (Lester)	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Russell Ranch	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12

Table 3.4-3 Summary of Biological Resources Impacts and Mitigation Measures

Reach	Impact 3.4-1: Special-Status Species and Habitats	Impact 3.4-2: Western Pond Turtle	Impact 3.4-3: Giant Garter Snake	Impact 3.4-4: Impacts on Valley elderberry longhorn beetle (VELB)	Impact 3.4-5: Impacts on Swainson’s Hawk	Impact 3.4-6: Impacts on Nesting Birds	Impact 3.4-7: Impacts on Special-Status Bats	Impact 3.4-8: Impacts on Rare Plants	Impact 3.4-9: Impacts on Riparian Habitat	Impact 3.4-10: Impacts on Fish	Impact 3.4-11: Impacts on Wetland Habitats	Impact 3.4-12: Impacts on Wildlife Movement	Impact 3.4-13: Impacts on Biological Resources from Herbicide Use	Applicable Mitigation Measures
Stevenson Bridge	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Glide Ranch	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Nishikawa	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Olmo-Hammond-UC Davis	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
I-80 to Old Davis Road	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Old Davis Road to Mace	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Mace to Road 106A	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12
Road 106A to YBWA	SM	SM	SM	SM	SM	SM	SM	SM	SM	SM	LTS	SM	SM	MM 3.4-1 – 3.4-12

Notes: NI = No Impact, LS = LTS = Less-than-significant Impact, SM = Significant but Mitigatable to Less-than-significant with measures identified in this section, SU = Significant and Unavoidable, even after mitigation.