4.5 TERRESTRIAL BIOLOGICAL RESOURCES

Issues & Supporting Information Sources	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a. 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 California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c. 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?	☐	☒	☐	☐
d. 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?	☐	☐	☒	☐
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

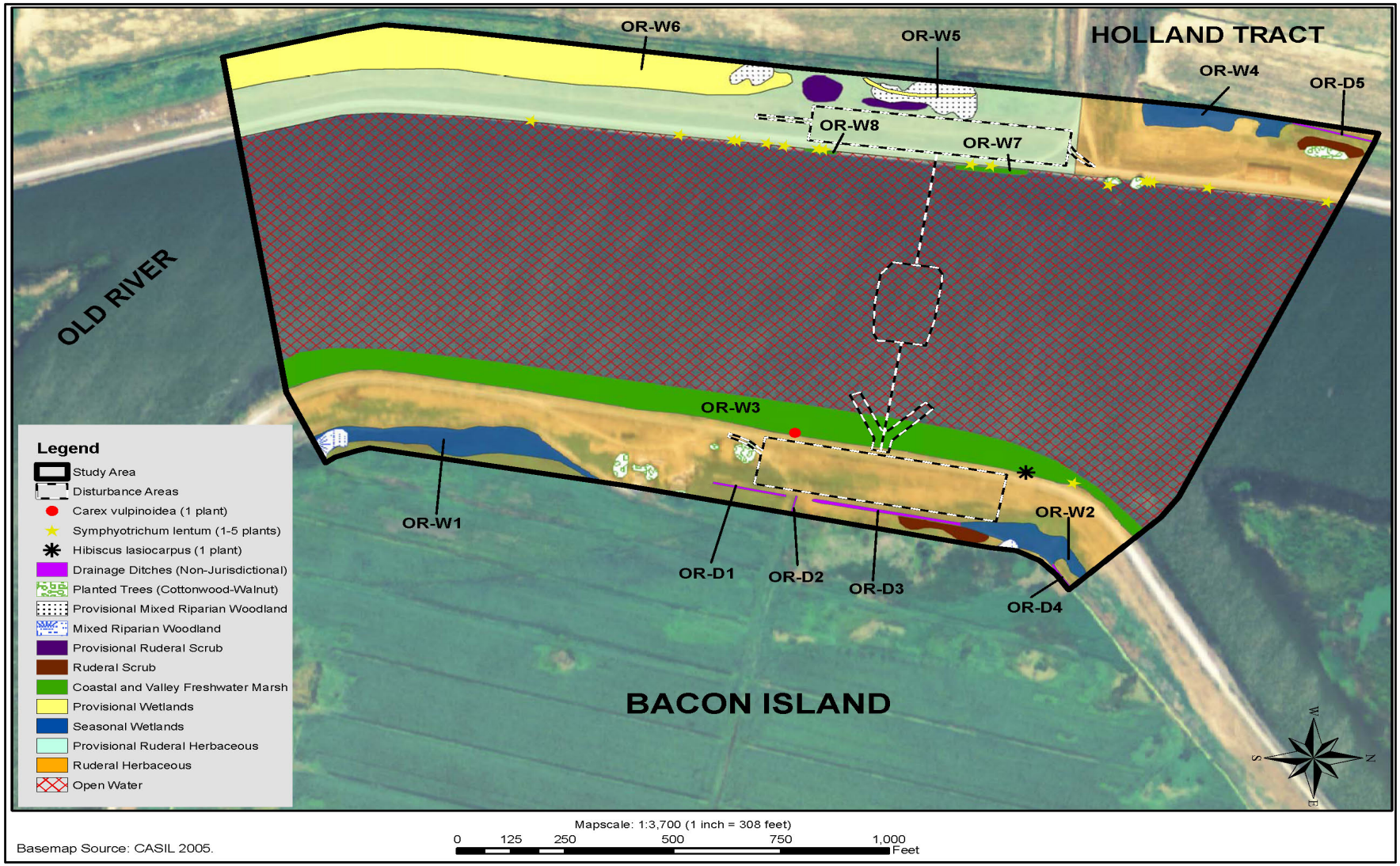
The terrestrial biological resources investigation for the Project is based on surveys conducted in the Project area on Bacon Island and Holland Tract. In the case of Mandeville Island, the resource assessment is provisional, based on a review of aerial photography and binocular-aided visual scans of the riverbank from Bacon Island. From that, preliminary assumptions were made about the types of habitats present and estimates of their size and location. For all sites within the Project area, the following pertinent documents were used:

- California Natural Diversity Database list for Project area (DFG 2008)
- California Native Plant Society's (CNPS) plant list for the Brentwood, Jersey Island, Woodward Island, and Bouldin Island 7.5-minute quadrangles, via electronic inventory (CNPS September 2008)

- USFWS endangered and threatened species list for the Brentwood, Jersey Island, Woodward Island, and Bouldin Island 7.5-minute quadrangles (USFWS 2008)
- DFG Special Status Species List (DFG 2008)
- Action Specific Implementation Plan for the Contra Costa Canal Replacement Project, CCWD, March 2007
- Preliminary Delineation of Waters of the United States for the Delta Wetlands Project (Jones & Stokes 2001) and correspondence with the Natural Resources Conservation Service (April 2, 2002), Jones & Stokes (April 19, 2002), and the Sacramento District of the U.S. Army Corps of Engineers (Corps) (May 20, 2002) concerning jurisdictional areas on Holland Tract, Bacon Island, Bouldin Island and Webb Tract.

Mosaic Associates conducted preliminary wetland delineations at the Old River and Connection Slough sites on Holland Tract and Bacon Island and at the alternate storage site on Holland Tract. The field work for the preliminary delineation at Mandeville Island will be conducted prior to Project construction. Delineations were carried out on August 1 and 8, 2008; and September 9, 23 and 29, 2008. The preliminary delineation, "Delineation and Preliminary Jurisdictional Determination of Wetlands and Other Waters of the U.S. under Section 404 of the Clean Water Act for the Proposed Two-Gates Project Area, Contra Costa and San Joaquin Counties, California" (Mosaic Associates, September 2008), is included in Appendix H.

An inventory of habitats present within the study areas defined for the Project and an assessment of the presence of habitats suitable for terrestrial special-status species were conducted by Mosaic Associates on August 1 and 8, 2008; and September 9, 23 and 29, 2008. Maps of habitats are depicted in Figures 4.5-1, 4.5-2, and 4.5-3.



1 **Figure 4.5-1 Habitats on the Old River Study Area**

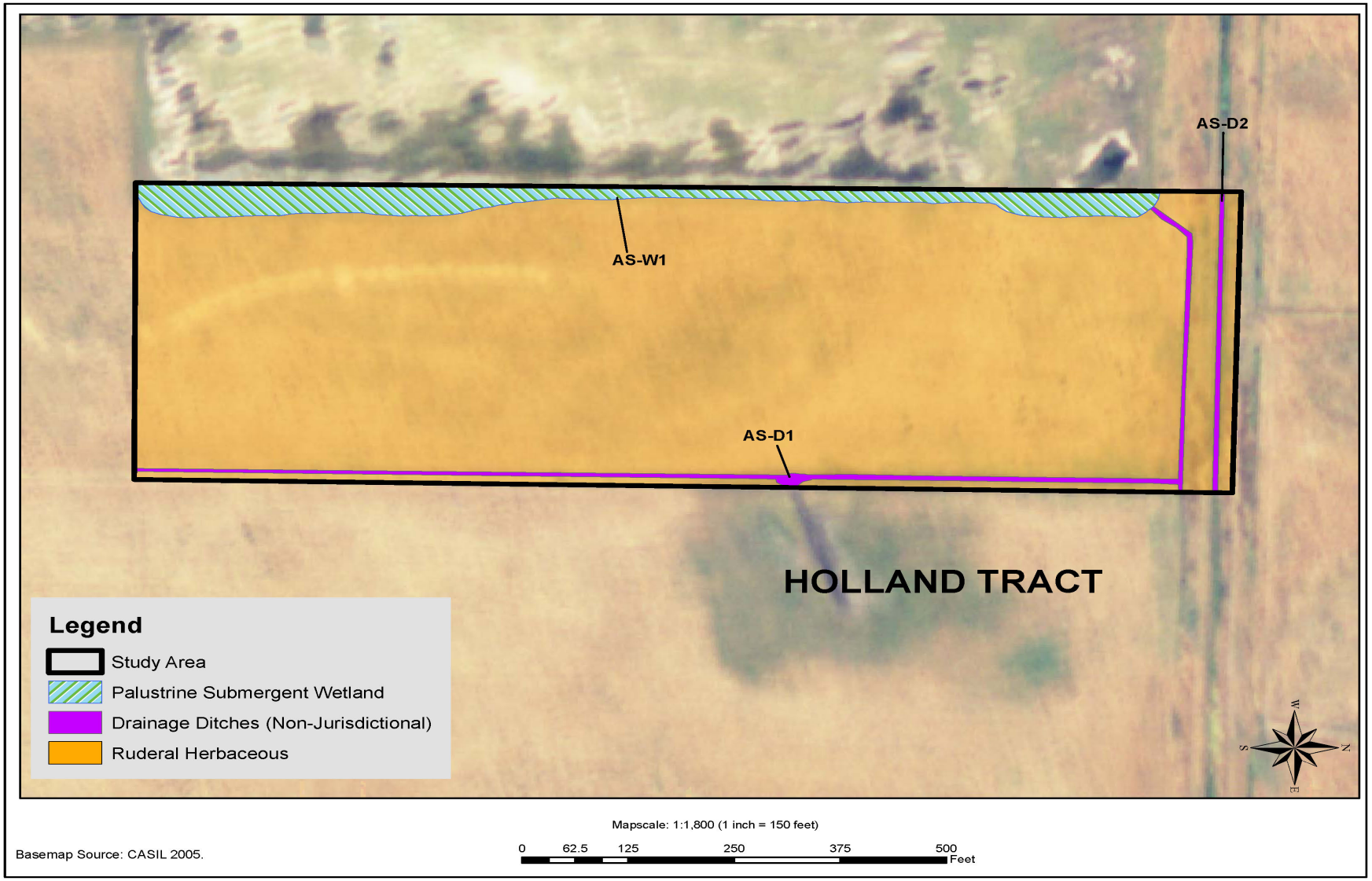


Figure 4.5-2 Habitats on the Holland Tract Alternate Storage Site

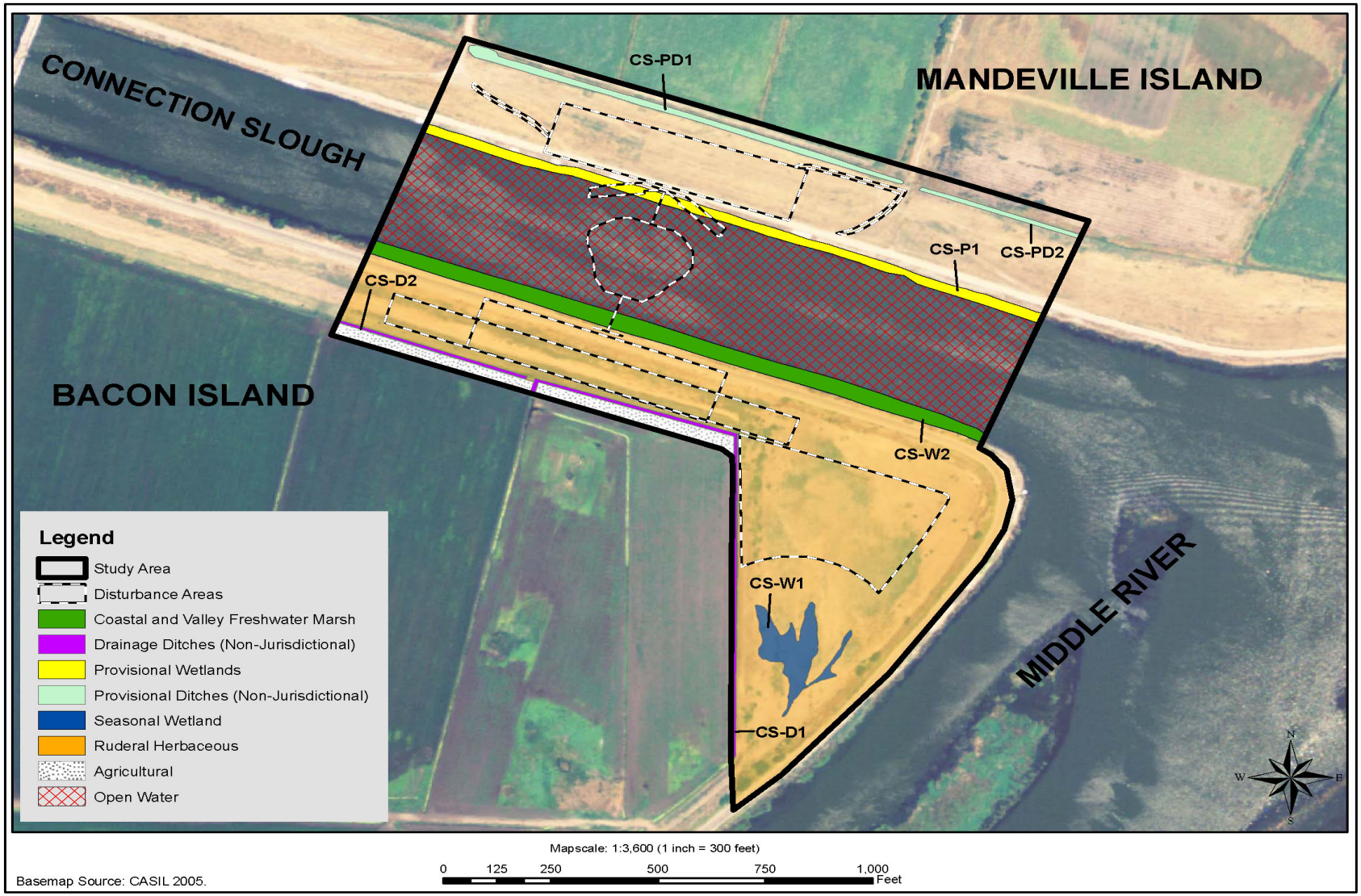


Figure 4.5-3 Habitats on the Connection Slough Study Area

Summer rare plant surveys for late-blooming species at the Old River, Holland Tract alternate storage area, and Connection Slough sites were conducted on September 23 and 29, 2008. Two summer-blooming rare plants were detected, woolly rose mallow (*Hibiscus lasiocarpus*, List 2.*2*) and Suisun Marsh aster (*Symphyotrichum lentum*, List 1B.2). A spring rare plant survey was conducted at all three sites on June 24, 2009. One spring-blooming rare plant was detected – brown fox sedge (*Carex vulpinoidea*, List 2). Rare plant survey results are reported in the Rare Plant Surveys, Two Gates Project Locations letter report (Mosaic Associates, July 10, 2009), enclosed in Appendix I.

A habitat assessment for the federally and state threatened giant garter snake (GGS) (*Thamnophis gigas*) was conducted by Swaim Biological, Inc. (2008). The 2-Gates Project Habitat Assessment for the Giant Garter Snake (*Thamnophis gigas*) (Swaim Biological 2008) is enclosed in Appendix J.

Dry- and wet-season sampling for federally listed large branchiopods, including vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*) and Conservancy fairy shrimp (*Branchinecta conservatio*) consistent with USFWS' Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods (1996) were conducted in the 0.5-acre wetland on Bacon Island south of Connection Slough in October 2008 (dry season) and November and December 2008, and January, February and March 2009 (wet season) (Helm Biological 2009a, 2009b, 2009c). No listed large branchiopods were detected during the surveys, and since the wetland never ponded water during any of the wet season site visits, the wetland basin was determined to be unsuitable for federally listed large branchiopods. The wet- and dry-season reports, as well as supplementary information on rainfall during the wet-season surveys (Helm Biological 2009c) are enclosed in Appendix K.

4.5.1 Environmental Setting

The study areas on Bacon Island and Mandeville Island are actively farmed, and land surrounding the agricultural fields is regularly disked. Portions of Holland Tract are under cultivation, but in the study area, the fields are fallow. Adjacent fields on Holland Tract were utilized as rangeland for cattle at the time of the field visit. Maintenance dredging occurs in the agricultural ditches on all islands. The alternate storage site on Holland Tract was grazed by cattle at the time of the site visit.

Most of the land bordering the study areas is farmland, rangeland, or open space. Several unused structures (old farmhouses) are located on Bacon Island near the Old River site; a large barn is located on Holland Tract. A structure is visible on aerial photographs of Mandeville Island near the access bridge.

Levees have been constructed along both banks of Old River and Connection Slough. The roads on the Old River levees are private. The road on the Bacon Island side of Connection Slough is public, while the road on Mandeville Island is private. Periodic levee maintenance includes the control of vegetation and repairs of the riprap above the waterline.

The portion of the Project located on Holland Tract is located in Contra Costa County. The remainder of the Project (the Bacon Island and Mandeville Island sites) is located in San Joaquin

County. The study areas in which the Project effects on terrestrial species and wetland and other waters habitats were evaluated encompass a larger area than the area subject to construction disturbance associated with the construction of the gates. This allowed for a comprehensive analysis of the effects of the Project on potentially occurring special-status species associated with the construction and operation of the gates.

4.5.1.1 Special-Status Natural Communities

One special-status natural community is present within the study area – Coastal and Valley Freshwater Marsh. This vegetation community characteristically forms a dense vegetative cover dominated by perennial, emergent monocots 1 to 15 feet high that reproduce by underground rhizomes. This series is most extensive in the upper portion of the Sacramento-San Joaquin River Delta, and is common in the Sacramento and San Joaquin valleys in river oxbows and other areas on the flood plain (Holland 1986). Narrow bands of vegetation, approximately 10 feet wide, along the levee margins fit this description. Nearby islands within the Old River and Connection Slough channels also fit this description, although they are just outside the study area. Narrowleaf cattail (*Typha angustifolia*), tule rush (*Schoenoplectus acutus*), and California bulrush (*Schoenoplectus californica)* are among the dominant hydrophytes of Connection Slough and Old River.

4.5.1.2 Special-Status Species

Special-status plant, fish, and terrestrial species are generally defined as those species that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. This includes species protected under federal and California Endangered Species Acts (ESA and CESA) and species identified as sensitive by the California Department of Fish and Game (DFG), and species identified in the CNPS's Inventory of Rare and Endangered Vascular Plants of California (CNPS 2008).

Searches were conducted for sensitive biological resources that have been documented in the U.S. Geological Survey (USGS) Woodward Island, Bouldin Island, Jersey Island, and Brentwood 7.5-minute quadrangles, which cover the Project sites and vicinity. The nine-quadrangle area recommended by CNPS and DFG protocol was not searched because the range of habitats within a nine-quadrangle search of the surrounding area is much more diverse than the habitats encountered within the study area and within the four-quadrangle search. The four-quadrangle search that was conducted encompasses the habitat types, and therefore the suite of species that may reasonably be encountered in the vicinity of the Project site. The California Natural Diversity Database (CNDDB) also was searched, as were the USFWS-generated list of Federal Endangered and Threatened Species that occur in the four USGS quadrangles listed above; and the CNPS' Inventory of Rare and Endangered Plants of California. Based on these database searches and existing site conditions, animal species having the potential to occur on the Project site were identified based on their occurrence in the search area and the presence of habitat suitable for those species. These include Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), giant garter snake (*Thamnophis gigas*), western pond turtle (*Actinemys marmorata*), northwestern pond turtle (*Actinemys marmorata marmorata*), Swainson's hawk (*Buteo swainsoni*), tricolored blackbird (*Ageliaus tricolor*), black rail (*Laterallus jamaicensis*

coturniculus), western burrowing owl (*Athene cunicularia*), and loggerhead shrike (*Lanius ludovicianus*).

4.5.1.3 Terrestrial Environment

Habitats present in the study areas include ruderal herbaceous, agricultural cropland, ruderal scrub, coastal and valley freshwater marsh, palustrine submergent wetland, seasonal wetland, and mixed riparian woodland, and planted trees. Figures 4.5-1, 4.5-2, and 4.5-3 depict the habitat types present within the study areas. Habitat types are described below.

Ruderal Herbaceous. This habitat type is the most common one found within the study areas. Ruderal herbaceous communities are those, which colonize highly disturbed areas. Portions of the study areas receive regular discing maintenance. This habitat type would correspond most closely to Holland's (1986) Pasture series (11206), or to Sawyer and Keeler-Wolf's California Non-Native Grassland series (1995). Dominant herbaceous species observed in the ruderal herbaceous areas included ripgut brome (*Bromus diandrus*), poison hemlock (*Conium maculatum*), Bermuda grass (*Cynodon dactylon*), Mediterranean mustard (*Hirschfeldia incana*), field radish (*Raphanus sativus*), and stinging nettle (*Urtica dioicia*).

Agricultural. Small areas within the study area were under active cultivation for crops such as sunflower (*Helianthus annuus*) and corn (*Zea mays*).

Ruderal Scrub. Ruderal scrub is similar to ruderal herbaceous habitat, in that it is a plant community that colonizes disturbed areas, but instead it is composed of bushy, woody, or taller-statured species. A few patches of dense, monotypic Himalayan blackberry (*Rubus discolor*) located on Holland Tract and Bacon Island within the Old River study area fit this description.

Coastal and Valley Freshwater Marsh. This series is dominated by cattails up to 4 meters tall, and is most extensive in the upper portion of the Sacramento-San Joaquin River Delta. It is common in the Sacramento and San Joaquin valleys in river oxbows and other areas on the flood plain (Holland 1986). Narrowleaf cattail, tall fescue, and tule rush are among the dominant hydrophytic species along the agricultural ditches and on the levee margins of Connection Slough and Old River.

Palustrine Submergent Wetland. One pond feature, located adjacent to the Holland Tract alternate storage site, occurs within the study area. The pond was excavated to provide fill for a nearby road and is inundated with water pumped from the river through the growing season. It functions as a stock pond. At the time of our field visit on September 23, it held approximately 2 to 3 feet of water at its deepest, while at its margins, the water depth was closer to 6 inches. This habitat would conform most closely to Cowardin, Cartern, Golet, & LaRoe's (1979) palustrine wetland, or Holland's (1986) Permanently Flooded Lacustrine (11520) series. This submerged wetland contains greater than 5 percent vegetation, the majority of which is a submerged aquatic pond weed (*Potamogeton sp.*). The edges of the pond feature host some emergent plants, including tule rush, and an unidentifiable sedge, which may be bull tule (*Scirpus robustus*). Due to the grazing, this emergent vegetation is sparse. Algal matting is also present on the surface of the water.

Seasonal Wetland. Seasonal wetlands occur throughout the study areas in a variety of geomorphic settings including swales, shallow concave basins, and irrigation ditches and canals; primarily in areas with concave topography and fine textured and/or compacted soils which impede surface water infiltration, or allow groundwater infiltration to occur. The seasonal wetland on Bacon Island near Connection Slough was located in a shallow, sparsely vegetated basin south of the proposed gate. Species that occur in the basin or near the margin include Bermuda grass, umbrella sedge (*Cyperus eragrostis*), knotweed (*Polygonum arenastrum*), and dogbane (*Apocynum cannabinum*). On the Holland Tract, and on Bacon Island near Old River, the seasonal wetlands were dominated by Bermuda grass and water smartweed (*Polygonum amphibium*).

Mixed Riparian Woodland. Although not specifically described in Holland (1986), mixed riparian woodland consists of annual and perennial native and non-native riparian herbaceous and woody species. This vegetation type is typically found along stream and river banks, on terraces adjacent to floodplains, and along perennial or intermittent streams, gullies, springs or seeps. On site, the mixed riparian woodland would conform most closely to Holland's Great Valley Willow Scrub (63410), described as "An open to dense, broadleafed, winter-deciduous shrubby streamside thicket dominated by any of several Salix species. Dense stands usually have little understory or herbaceous component. More open stands have grassy understories, usually dominated by introduced species" (Holland 1986). Mixed riparian woodland on Bacon Island occurs near Old River and includes mostly shrubby willows (*Salix sp.*), most of which are not tall in stature, but do form a dense stand. On Mandeville Island, maps indicate that there is a riparian area nearby the Project site that may provide mixed riparian woodland habitat.

Planted Trees. In a small area around the abandoned farmhouse on Bacon Island at Old River, several planted trees are present, including cottonwood (*Populus fremontii*), apple (*Malus x domestica*), and sweet almond (*Prunus dulcis*).

4.5.1.4 Terrestrial Animals

The Project sites are located on the Woodward Island and Bouldin Island USGS 7.5-minute quadrangles. Because of the location of the sites near the edges of the quadrangles, we also included the contiguous Brentwood and Jersey Island quadrangles for our analysis of potentially occurring species. A list of terrestrial animal species for these quadrangles contained 12 federally listed species under the jurisdiction of the USFWS and three additional state-listed species (Table 4.5-1). Four species are listed by both the federal ESA and CESA.

Wildlife observed on the Project sites during the August and September 2008, and June 2009 site visits to the Old River and Connection Slough sites included Swainson's hawk, northern harrier (*Circus cyaneus*), western gull (*Larus occidentalis*), barn swallow (*Hirundo rustica*), double-crested cormorant (*Phalacrocorax auritus*), red-winged blackbird (*Agelaius phoeniceus*), bull frog (*Rana catesbiana*), cat fish (*Ictalurus* spp.), mink (*Mustela vison*), and ground squirrel (*Spermophilus beecheyi*). Additionally, sign of raccoon (*Procyon lotor*) and coyote (*Canis latrans*) was observed. At the time of the site visit, the pond feature at the Holland Tract alternate storage site hosted many shorebirds, including American white pelican (*Pelecanus erythrorhynchos*), killdeer (*Charadrius vociferans*), white-faced ibis (*Plegadis chihi*), red-necked phalarope (*Phalaropus lobatus*), black-necked stilt (*Himantopus mexicanus*), red winged

blackbird, tree swallow (*Tachycineta bicolor*), barn swallow, eared grebe (*Podiceps nigricollis*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), great blue heron (*Ardea herodias*), and a flock of two to three dozen "peeps," likely least sandpipers (*Calidris minutilla*). Virginia rail *(Rallus limicola)* and sora *(Porzana Carolina)* could also occur at the Project sites.

Terrestrial mammal species that may utilize the Project sites and vicinity include black-tailed jackrabbit (*Lepus californicus*), red fox *(Vulpes vulpes)*, gray fox *(Urocyon cinereoargenteus)*, America badger *(Taxidea taxus)*, long-tailed weasel *(Mustela frenata)*. California ground squirrels are present on Bacon Island. Other rodents such as California meadow voles (*Microtus californicus*), house mouse *(Mus musculus)*, deer mouse *(Peromyscus maniculatus)*, and Botta's pocket gopher (*Thomomys bottae*) could also be present at the Project sites.

Mammals that use aquatic habitat, including the river otter *(Lutra canadensis)*, common muskrat, *(Ondatra zibethicus)*, and American mink could also occur within the Project sites. Additionally, the beaver *(Castor canadensis)* has been documented as occurring in marshes along the lower San Joaquin River (DWR 2008) and has the potential to occur at the Project sites.

Reptiles that could use habitat within the Project sites and vicinity include the gopher snake *(Pituophis melanoleucus)*, terrestrial garter snake *(Thamnophis elegans)*, striped racer *(Masticophis lateralis)* (DWR 2008), GGS, and western and northwestern pond turtles.

No proposed or designated critical habitat for terrestrial species occurs in the Project sites. Table 4.5-2 provides a list of terrestrial animal species of special concern and indicates whether they have been found on the sites or in the four 7.5-minute quadrangle map area noted above. Several special-status birds and other birds that receive protection under the Migratory Bird Treat Act (MBTA) and the California Fish and Game Code have the potential to nest or forage on the Project sites and in the vicinity.

Table 4.5-1 Federally Listed and State-Listed Terrestrial Wildlife Species Known from the Vicinity of the Project

Common Name	Scientific Name	Listing Status[1]		Designated Critical Habitat	Critical Habitat on Project Site	Likelihood of Occurrence in Project Area
		Federal	State			
Invertebrates						
Conservancy fairy shrimp	*Branchinecta conservatio*	FE		Yes	No	Highly unlikely. Not detected during 2008/2009 surveys.
Longhorn fairy shrimp	*Branchinecta longiantenna*	FE		Yes	No	Highly unlikely. Not detected during 2008/2009 surveys.
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	--	Yes	No	Highly unlikely. Not detected during 2008/2009 surveys.
Delta green ground beetle	*Elaphrus viridis*	FT		Yes	No	Highly unlikely. Atypical habitat.

Table 4.5-1 Federally Listed and State-Listed Terrestrial Wildlife Species Known from the Vicinity of the Project

Common Name	Scientific Name	Listing Status[1]		Designated Critical Habitat	Critical Habitat on Project Site	Likelihood of Occurrence in Project Area
		Federal	State			
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE		Yes	No	Highly unlikely. Not detected during 2008/2009 surveys. t
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT		Yes	No	None. Elderberry host plant is absent.
Amphibians						
California tiger salamander	*Ambystoma californiense*	FT	SSC	Yes	No	None. Site is isolated from occupied habitat.
California red-legged frog	*Rana aurora draytonii*	FT		Yes	No	None. Presumed to be extirpated from region due to colonization by introduced species.
Reptiles						
Alameda whipsnake	*Masticophis lateralis euryxanthus*	FT	ST	Yes	No	None. No suitable habitat.
Giant garter snake	*Thamnophis gigas*	FT	ST	No	No	Low. Suitable habitat is present.
Birds						
Swainson's hawk	*Buteo swainsoni*	---	ST	No	No	Moderate Observed foraging on Bacon Island, 9/8/08, and on Holland Tract 6/24/09. Pair observed in nest tree on east side of Bacon Road, at the SW corner of lower Jones Tract at Middle River.
California black rail	*Laterallus jamaicensis coturniculus*	--	ST	No	No	Moderate. Documented in Old River in study area, and Middle River, near study area in 1992 and 1993
California clapper rail	*Rallus longirostris obsoletus*	FE	SE	No	No	None. Not known from vicinity of project.
Bank swallow	*Riparia riparia*	--	ST	No	No	None. No suitable nesting habitat.

Table 4.5-1 Federally Listed and State-Listed Terrestrial Wildlife Species Known from the Vicinity of the Project

Common Name	Scientific Name	Listing Status[1]		Designated Critical Habitat	Critical Habitat on Project Site	Likelihood of Occurrence in Project Area
		Federal	State			
Mammals						
San Joaquin kit fox	*Vulpes macrotis mutica*	FE	ST	No	No	None. Isolated from occupied habitat in region.

Note: Species list developed from the USFWS List of Endangered and Threatened Species that Could Occur or May be Affected by the Project (USFWS 1/31/08) and the CNDDB occurrences recorded for the Jersey Island, Bouldin Island, Brentwood, and Woodward Island quadrangles, which contain the Project sites.

[1]Listing status definitions: FT = federally listed as threatened; FE = federally listed as endangered; FSC = federal species of concern; ST = state listed as threatened; SE = state listed as endangered; SSC = state species of special concern; SFP = state fully protected species.

1

Table 4.5-2 State[1] Terrestrial Wildlife Species of Concern and Fully Protected Species Known from the Vicinity of the Project

Common name	Scientific name	Listing Status[2]	Documented to Occur in Project Site	Likelihood of Occurrence in Project Area
Reptiles				
Western pond turtle	*Actinemys marmorata*	SSC	Yes, in three locations 2002	High. Observed in canals adjacent to project site.
Northwestern pond turtle	*Actinemys marmorata marmorata*	SSC	No	High. Observed in canals adjacent to project site.
Silvery legless lizard	*Anniella pulchra pulchra*	SSC	No	None. No suitable habitat.
Birds				
Tricolored blackbird	*Agelaius tricolor*	SSC	No	Moderate. Suitable habitat is present.
Burrowing owl	*Athene cunicularia*	SSC	No	Unlikely. Suitable habitat is present, but no records from vicinity.
Northern harrier	*Circus cyaneus*	SSC	Yes, observed foraging 6/24/09	Moderate. Suitable habitat is present.
White-tailed Kite	*Elanus leucurus*	DFG Fully Protected	No	Moderate. Suitable habitat is present.
Heron/egret/cormorant rookeries	*Egretta sp, Ardea sp,, Phalacrocorax sp.*	Great blue heron is a "special animal"	No	Moderate. Suitable habitat is present.
Loggerhead shrike	*Lanius ludovicianus*	SSC	No	Moderate. Suitable habitat is present.
Mammals				
Western red bat	*Lasiurus blossevillii*	SSC	No	Moderate. Suitable habitat is present.

Note: Species list developed from the CNDDB occurrences recorded for the Brentwood, Woodward Island, Bouldin Island, and Jersey Island quadrangles, which contain the Project sites, or the presence of suitable habitat.

[1]No federal terrestrial wildlife species of special concern are present in the vicinity of the Project.

[2]Listing status definitions: SSC = state species of special concern.

INVERTEBRATES

Focused surveys for the federally threatened vernal pool fairy shrimp, vernal pool tadpole shrimp and Conservancy fairy shrimp were conducted in the 0.5-acre seasonal wetland on Bacon Island at Connection Slough (Helm Biological 2009a, 2009b). Historically, this was not VPFS or VPTS habitat, but the levees have isolated the area from the prolonged periods of flooding that occurred historically. No listed large branchiopods were detected, and the wetland was determined to be unsuitable for these species.

The Project sites, access roads, and 100-foot buffer areas were surveyed for the presence of elderberry shrubs (*Sambucus* spp.), which serve as the host plant for valley elderberry longhorn beetle. No elderberries were detected during these surveys, leading to the conclusion that valley elderberry longhorn beetle is absent from the Project area.

AMPHIBIANS AND REPTILES

A habitat assessment by Swaim Biological (2008) concluded that the Project sites are located within the historic and current range of GGS, and that suitable habitat for the GGS exists within the study areas for the Project (Appendix J).

The GGS has four main habitat requirements as outlined by the draft recovery plan: (1) adequate water during active season to support prey species (i.e., blackfish [*Orthodon microlepidotus*], Pacific tree frog [*Pseudacris regilla*], carp [*Cyprinus carpio*], mosquito fish [*Gambusia affinis*] and bullfrogs [*Rana catesbeiana*]); (2) emergent wetland vegetation (i.e., cattails [*Typha spp.*]) and bulrushes (*Scirpus spp.)* for foraging habitat and cover from predators; (3) upland habitat with grassy banks and openings in vegetation for basking; (4) higher elevation upland habitats for cover and refuge (i.e., burrows and crevices) from flood waters during winter (USFWS 1999).

Habitat quality for the GGS is generally good at all sites within the Project area. The main waterways, including the Old River, are likely not highly preferred habitat, but may provide corridors for movement. These contain the basic features necessary for GGS, including emergent vegetation and cover. The banks of the Old River are lined with rip-rap with interstitial spaces that provide cover from predators and that also may aid in thermoregulation. Much of the Old River is also lined by cattails and bulrush. Both plants provide cover and are positively associated with GGS presence. The results of the habitat features associated with each site are summarized in Table 4.5-3 and discussed in greater detail below.

The west bank of the Old River is adjacent to high-quality GGS habitat. A small canal that runs parallel to the levee road may provide foraging habitat though the deep banks and quantity of emergent vegetation creates a fair amount of shade that may inhibit thermoregulation. The larger, diked canal perpendicular to the levee road provides better foraging habitat for GGS. The banks are moderately sloped with abundant emergent vegetation for cover, and with adequate exposure for thermoregulation. The canal itself appears to have slow-flowing water, and a silt substrate, features positively associated with GGS. Small schools of catfish (*Ictalurus* spp.) are present in the canal. These are generally regarded as predatory game fish, but young catfish may also be a prey source for GGS (USFWS 1999). The levee provides upland habitat and winter refugia above the high water mark. California ground squirrels are absent, but other rodents such as

California meadow voles (*Microtus californicus*) are likely present and provide burrows that may be used as retreats for GGS.

The west bank of the Old River site has suitable habitat and there are seasonal wetlands that provide potential forage and cover habitat during the GGS active season that are just to the west across the dirt road. On the east side of Old River, there are wetlands directly fringing the riverbank that comprise the best GGS habitat on the east side of the Old River within the project site.

In the Connection Slough Project location on Bacon Island, the study area is adjacent to an irrigation ditch with shallow water flowing over silt. Abundant bullfrogs and mosquitofish, both prey species for GGS, were observed in the ditch. The presence of bullfrogs suggests that the channel provides water year-round since bullfrog tadpoles do not metamorphose until their second season, overwintering in their larval form. Other crucial habitat features such as emergent vegetation and upland habitat were present at the site. California ground squirrels, whose burrows provide ideal hibernacula for GGS, also were observed. A seasonal wetland south of the proposed gate may provide additional foraging areas in the spring.

Surveys were not possible on Mandeville Island, but a provisional analysis of aerial photography and a binocular-aided scan of the riverbank were made. It appears from these that within the study area on Mandeville, a drainage ditch similar to those encountered on Bacon Island exists, and that emergent vegetation is present along the Connection Slough that could provide suitable GGS habitat.

Table 4.5-3 Summary of GGS Habitat Features Present at each Site

Site Location	Water Availability	Prey Species	Emergent Vegetation	Basking sites	Upland Refugia and Burrows
Old River Gate Site	Year-round	Fish present	Present	Present	Present
Connection Slough Gate Site, Bacon Island	Year-round	Fish present Bullfrogs present	Present	Present	Present
Holland Tract Alternate Storage Site	Seasonal	Fish present	Present but sparse due to grazing	Present	Present

Western pond turtle (WPT) has been reported on the Project sites and in the Project vicinity and suitable habitat exists onsite for this species. Large woody debris, rip-rap, and shallow water with algal mats or emergent vegetation often harbor WPT. Nesting sites are usually on south or west-facing slopes with bare, clay, or silt soils, or with sparse vegetation of short grasses or forbs, and may be located as much as 1,319 feet from suitable aquatic habitat (Holland 1994). Additionally, there is a record of the northwestern pond turtle northeast of the Project study area WPT has recently received some taxonomic study. Formerly this species was called *Clemmys marmorata*. The species phylogeny had been split into two subspecies, a northern (*A. m. marmorata*) and a southern (*A. m. pallida*). The characters used to distinguish the species were, however, ill-defined, and it has been argued that the subspecies distinction should be abandoned,

and a new phylogeny should be applied, reuniting the species under *A. marmorata* while recognizing the existence of four distinct clades (Bury & Germano 2008, Spinks & Shaffer 2005). Records for both WPT and northwestern pond turtle exist for the Project sites, but these subspecies are now considered one species. Regardless of the name applied to the species or subspecies, records for WPT exist on the Project sites and within the vicinity.

Other special-status amphibian and reptiles, including California red-legged frog (*Rana aurora draytonii*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), California tiger salamander (*Ambystoma californiense*), and silvery legless lizard (*Anniella pulchra pulchra*) are not expected to occur at the Project sites or vicinity due to the absence of suitable habitat (Alameda whipsnake), isolation from occupied habitat in the region and historic site conditions that were unsuitable (California tiger salamander, silvery legless lizard), or their extirpation from this portion of the Delta due to the mass colonization of introduced fishes and bullfrogs (California red-legged frog).

BIRDS

Swainson's hawk was observed foraging on Bacon Island on September 8, 2008, and June 24, 2009, and there is a documented nest tree 2.5 miles to the southwest on the Lower Jones Tract along Middle River. Large trees suitable for nesting are present on Holland Tract and Bacon Island near the Project location. Large trees may be present on Mandeville Island, either within the Project site or within 250 feet of the Project site.

California black rails have been documented in the study area within Old River and in Connection Slough, as well as in Middle River, although no black rail vocal responses were heard anywhere near the Project sites during recent black rail surveys conducted by DWR (personal communication, M. Bradbury 2009). The records indicate that the birds were observed on the in-channel islands near the study areas. Black rails use marsh and mudflat habitat, retreating to areas with dense cover when tides are high. The levee habitats on site provide only marginal cover in high tide situations.

Suitable habitat for the western burrowing owl is present on Bacon Island near Connection Slough. However, no sign of owl use was observed on September 8, 2008, and the habitat area is small and disconnected from other areas known to host burrowing owl.

The tricolored blackbird and the loggerhead shrike have the potential to occur onsite due to presence of suitable habitat. Habitat suitable for bank swallow (*Riparia riparia*) nesting is absent from the Project sites.

Large trees are present on the Holland Tract, Old River site, both within the study area (within the "provisional mixed riparian woodland" polygons in Figure 4.5-1), and within 0.25 miles of the study area on Holland Tract to the northwest and the south. Large trees also appear to be located on Mandeville Island that could serve as potential nesting sites for other raptors and migratory birds, and the study area does provide foraging habitat for Swainson's hawk, northern harrier, white tailed kite (*Elanus leucurus*), and other birds of prey. Northern harriers are a ground nesting species, establishing their nests in undisturbed patches of dense, tall vegetation (Shuford 2008). Northern harriers were observed foraging in the Project vicinity on June 24, 2009. White tailed kite build nests placed near top of dense oak, willow, or other tree stands;

usually 6 to 20 meters (20-100 feet) above ground (Dixon et al. 1957). Suitable nesting habitat is present in the riparian scrub and the planted trees for these and other birds covered under the MBTA.

Large wading bird species, such as the great blue heron, great egret (*Ardea alba*), and double-crested cormorants usually nest in colonies on the tops of secluded tall trees or snags; usually the tallest available (Zeiner et al. 1988-1990). No heron, egret, or cormorant rookeries have been observed on the Project sites.

MAMMALS

San Joaquin kit fox (*Vulpes macrotis mutica*) are not expected to occur at the Project sites due to the lack of connectivity between known kit fox occurrences and the Project sites, with the rivers and sloughs creating barriers to movement.

The western red bat (*Lasiurus blossevillii*) has the potential to roost on the sites. The abandoned farmhouse structures on Bacon Island; a barn located on the Holland Tract; and large mature trees on Bacon Island, Holland Tract, and possibly on Mandeville Island could serve as potential roosting habitat; however, there were no incidental observations of bats or sign of bats during the wetland delineation work (Mosaic Associates 2008). The structures and large trees present within the study area would not be disturbed, so the Project would not affect this species.

4.5.1.5 Plants

A 2008 CNDDB and CNPS search identified locations of special-status plant species within a four-quad radius of the Project sites. Eighteen plant species listed either under ESA or CESA or on the CNPS list are shown in Table 4.5-4. Soft bird's beak (endangered under ESA), Delta button-celery (endangered under CESA) and Antioch Dunes evening primrose (endangered under ESA and CESA), were the only endangered plant species documented to occur within the four-quadrangle search surrounding the Project sites.

Table 4.5-4 Special-Status Plant Species Identified within the Bouldin Island, Woodward Island, Jersey Island, and Brentwood 7.5 Minute Quadrangles Containing the Project Sites and Vicinity

Common Name Scientific Name	Potential to Occur in Study Area	Listing Status[1]		
		Federal	State	CNPS
Heartscale *Atriplex cordulata*	Very low. Some very marginal habitat present, but no alkaline soils observed.	–	–	List 1B
San Joaquin spearscale *Atriplex joaquiniana*	Very low. Some very marginal habitat present, but no alkaline soils observed.	–	–	List 1B
Big tarplant Blepharizonia plumosa	Very low. Some very marginal habitat present, but no occurrences reported. Grasslands on site receive regular disking.	–	–	List 1B
Round-leaved filaree *California macrophylla*	Low. Grasslands on site receive regular disking	–	–	List 1B
Bristly sedge *Carex comosa*	Moderate. Suitable habitat present in levee margins.	–	–	List 2

Table 4.5-4 Special-Status Plant Species Identified within the Bouldin Island, Woodward Island, Jersey Island, and Brentwood 7.5 Minute Quadrangles Containing the Project Sites and Vicinity

Common Name Scientific Name	Potential to Occur in Study Area	Listing Status[1]		
		Federal	State	CNPS
Brown fox sedge *Carex vulpinoidea*	Present. Documented to occur on study area (Old River) in spring 2009. Has potential to occur on levee margins.	–	–	List 2
Soft bird's-beak *Cordylanthus mollis ssp. mollis*	Very Low. Other halophytes do not occur in the study areas.	FE	SR	List 1B
Delta button-celery *Eryngium racemosum*	Low. May occur in Riparian Scrub on Mandeville, if present. Marginal habitat present.	--	SE	List 1B
Woolly rose-mallow *Hibiscus lasiocarpus*	Present. Also detected on islands of Old River in 1992. Suitable habitat present on levee margins. Detected on Bacon Island in summer 2008.	–	–	List 2
Delta tule pea *Lathyrus jepsonii var. jepsonii*	Low. Has potential to occur on levee margins.	–	–	List 1B
Mason's lilaeopsis *Lilaeopsis masonii*	Moderate to High. Documented as occurring on study area (Old River) in 2002; has potential to occur on levee margins.	–	SR	List 1B
Delta mudwort Limosella subulata	Low. Documented as occurring near study area, but mudflat habitat does not occur in study area.	–	–	List 2
Antioch Dunes evening-primrose *Oenothera deltoides ssp. howellii*	None. Dune habitats not present within the study areas.	FE	SE	List 1B
Eel-grass pondweed *Potamogeton zosteriformis*	Moderate. Suitable habitat present within aquatic habitats.	–	–	List 2
Marsh skullcap *Scutellaria galericulata*	Moderate. Suitable habitat present in levee margins.	–	–	List 2
Side-flowering skullcap *Scutellaria lateriflora*	Moderate. Suitable habitat present in levee margins.	–	–	List 2
Suisun Marsh aster *Symphyotrichum lentum*	Present. Documented in Old River north of study area; suitable habitat present in levee margins. Detected on Bacon and Holland in summer 2008.	–	–	List 1B
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	Very low. No alkaline soils observed.	–	–	List 1B

1FE = federally listed as endangered; SE = state listed as endangered; SR = state listed as rare; List 1B = rare, threatened, or endangered in California and elsewhere; List 2 = Rare, threatened, or endangered in California, but more common elsewhere.

Source: DFG 2008. Data compiled by Mosaic Associates in 2008.

Plants that rate a "Moderate" or higher likelihood of presence, based on an analysis of the habitats present within the study area, and upon documented occurrences of the species within the study area and within the four-quadrangle search area surrounding the Project sites, merit the conduct of rare plant surveys. The following eight special-status plant species with a moderate or higher potential to occur with in the study area were identified:

- Brown fox sedge (*Carex vulpinoidea*): Has been documented on Project site, on Bacon Island on bank of Old River in June 2009. Flowering Period: May-June.
- Bristly sedge (*Carex comosa*): Has same habitat requirements as *Carex vulpinoidea*, which has been documented on the Project site. Flowering Period: May to September. Not detected during summer rare plant surveys on Bacon Island and Holland Tract.
- Woolly rose-mallow (*Hibiscus lasiocarpus*): This plant was observed on the levee margin of Bacon Island at Old River during the September 2008 rare plant survey. It has been documented within the islands of Old River near the study area and on the levee margins just south of study area. Flowering Period: June to September. Detected on Bacon Island.
- Mason's lilaeopsis (*Lilaeopsis masonii*): 68 records within the four-quadrangle search; and 4 within the study area. Flowering Period: April to November. Not detected during summer rare plant surveys on Bacon Island and Holland Tract.
- Eel-grass pondweed *Potamogeton zosteriformis*: May occur in aquatic habitats on site, though none was observed during the summer rare plant survey. Flowering Period: June to July. Not detected during summer rare plant surveys on Bacon Island and Holland Tract.
- Marsh skullcap (*Scutellaria galericulata*): Occurs in marshes and swamps, suitable habitat is present on levee margins, though none was observed during the summer rare plant survey. Flowering Period: June to September. Not detected during summer rare plant surveys on Bacon Island and Holland Tract.
- Side-flowering skullcap (*Scutellaria lateriflora*): Occurs in marshes and swamps, suitable habitat is present on levee margins, though none was observed during the summer rare plant survey. Flowering Period: July to September. Not detected during summer rare plant surveys on Bacon Island and Holland Tract.
- Suisun Marsh aster (*Symphyotrichum lentum*): This species occurs on the levee margins of Old River, with one individual on the Bacon Island side, and several dispersed on the Holland Tract side. It has been documented near the Project site in Old River islands. Flowering Period: May to November. Detected on Bacon Island and Holland Tract during September 2008.

Special-status plant species surveys are recommended for the Project sites. A fall rare-plant survey was conducted on September 23 at the Old River and Holland Tract alternate storage site locations and on September 29 on the Bacon Island side of Connection Slough. A spring rare plant survey was conducted on the same sites on June 24, 2009. Three species, brown fox sedge, woolly rose mallow, and Suisun marsh aster, were detected within the study area (Figure 4.5-1).

The following four summer-blooming species with a moderate to high potential for occurrence were not detected during the surveys: bristly sedge, Mason's lilaeopsis, marsh skullcap, and side-flowering skullcap. In relation to Delta mudwort, although there are records in the vicinity, mudflat habitats suitable for this species are absent in the levee areas. Absence of such mudflat habitat greatly reduces the likelihood of this species' presence, and it was not observed during the summer rare plant survey. Additionally, the nativity of this species is under scrutiny; the Jepson Manual (Hickman 1993) lists it as a non-native.

The eight summer-blooming special-status species with a very low or low potential to occur were not detected during the summer rare plant survey. These included: heartscale (*Atriplex cordulata*), San Joaquin spearscale (*Atriplex joaquiniana*), big tarplant (*Blepharizonia plumosa*), soft bird's beak (*Cordylanthus mollis ssp. mollis*), Delta button-celery (*Eryngium racemosum*), Delta tule pea (*Lathyrus jepsonii var. jepsonii*), Delta mudwort and Antioch Dunes evening-primrose (*Oenothera deltoids ssp. howellii*).

A survey for spring blooming species at the Old River, the Holland Tract alternate storage site, and on the Bacon Island side of Connection Slough was conducted on June 24, 2009. One brown fox sedge plant was detected on the Bacon Island bank of Old River. The other spring blooming species with potential to occur, including round-leaved filaree (*California macrophylla*) and caper-fruited tropidocarpum (*Tropidocarpum cappariderum*), and eel grass pondweed (*Potamogeton zosteriformis*) were not detected during the spring rare plant survey.

Rare plant surveys on Mandeville Island have not yet been completed due to access constraints. It is unlikely that any rare plant species would be found on the landward side of the levee because the hillsides are regularly disked, dredging is used periodically to control vegetation and weed growth within the agricultural ditches, and the habitat requirements for the species with potential to occur are present on the river side of the levees.

4.5.1.6 Wetland Resources and Other Waters

A preliminary wetland delineation of the study areas on Holland Tract and Bacon Island was conducted in August and September 2008 (Mosaic Associates 2008). Table 4.5-5 provides the acreage of potentially jurisdictional wetlands and other waters of the U.S. Impacts to wetlands would be limited to the area of fill from the piles installed to support the boat ramps, shading effects from the boat ramps, and the installation of sheet piles perpendicular to the levees. Portions of the river beds (other waters) would be excavated and backfilled with rock to support the barges, and the barges would be secured to the riverbed.

Table 4.5-5 Acreages of Potentially Jurisdictional Waters of the United States†

Habitat	Feature	Hydrological Connectivity [1]	Adjacency [1]	Acreage	Approximate Area of Fill
In-channel Freshwater Marsh (FM)					
	CS-W2	Connection Slough	C	1.36	0.0006
	CS-P1	Connection Slough	C	0.87	0.0003
	OR-W3	Old River	C	3.39	0.0014
	OR-W7	Old River	C	0.06	0
	OR-W8	Old River	C	0.01	0
	FM Total			5.69	0.0023
Other Waters (OW)					
	CS-OW1	Old River, Middle River	C	10.83	0.93
	OR-OW1	Big Break	C	39.78	0.70
	OW Total			50.61	1.63

Table 4.5-5 Acreages of Potentially Jurisdictional Waters of the United States†

Seasonal Wetland (SW)					
	CS-W1		A	0.50	0
	OR-W1		A	0.81	0
	OR-W2		A	0.38	0
	OR-W4		A	0.40	0
	OR-W5		A	0.06	0
	OR-W6		A	3.12	0
	SW Total			5.27	0
Submerged Wetland (SM)					
	AS-W1	Connected via culvert to perennial canal, Holland Tract	CV	0.80	0
	SM Total			0.80	*0*
Total Jurisdictional				**62.37**	**1.6323**
Non-jurisdictional Irrigation/Drainage Ditches (D) *					
	AS-D1			0.22	0
	AS-D2			0.06	0
	CS-D1			0.23	0
	CS-D2			0.07	0
	CS-PD1			0.41	0
	CS-PD2			0.10	0
	OR-D1			0.02	0
	OR-D2			0.01	0
	OR-D3			0.07	0
	OR-D4			0.01	0
	OR-D5			0.03	0
	D Total			1.23	0
Total Non-Jurisdictional				**1.23**	**0**

Notes:

† Wetland areas on Mandeville Island and a portion of Holland Tract are provisional, based on aerial map interpretation.
CS = Connection Slough, OR = Old River W = wetland number, D = ditch number PW = potential wetland, PD = potential ditch; for mapped locations, see Appendix H.
Duration of fill discharge would be limited to the period of the demonstration project.
Areas on Mandeville are estimates.
* = A jurisdictional determination by the Corps has not been conducted. The ditches are assumed to be non-jurisdictional because they are inundated through water siphoned from the rivers.

In-Channel Freshwater Marsh

In-channel freshwater marsh, totaling 5.69 acres, is present on the project site along Old River and Connection Slough between the mean watermark (MWM) and ordinary high-water mark (OHWM). A conservative average width of 6 feet of hydrophytic vegetation along all banks of the canal that did not contain riprap was used to calculate the total acreage of these wetland features on the project site. The hydrophytic vegetation along the canal is strongly associated with the small bench of substrate located between the MWM and OHWM. Dominant hydrophytic vegetation in the in-channel freshwater marsh includes Tule rush (*Shoenoplectus californicus*, OBL), bulrush (*Shoenoplectus acutus*, OBL), and common cattail (*Typha latifolia*, OBL).

Table 4.5-5 Acreages of Potentially Jurisdictional Waters of the United States†

Seasonal Wetland
Seasonal wetland, totaling 5.27 acres, was delineated on Bacon Island and Holland Tract. Indicators of wetland hydrology included inundation, sediment deposits, and drainage patterns in wetlands. Dominant vegetation in the seasonal wetland included Bermuda grass (*Cynodon dactylon*, FAC), umbrella sedge (*Cyperus eragrosits*, OBL), knotweed (*Polygonum arenastrum*, NL), and water smartweed (*Polygonum amphibium*, OBL).

Submergent Wetland
Submergent wetland, totaling 0.80 acres, was delineated on Holland Tract in the alternate storage site. Indicators of wetland hydrology included inundation, and saturation. Dominant vegetation in the submerged wetland included pond weed (*Potamogeton* sp, OBL), Tule rush (*Shoenoplectus californicus*, OBL), and filamentous algae (OBL). On the fringes of this feature, we observed Bermuda grass (*Cynodon dactylon*, FAC), and cocklebur (*Xanthium strumarium*, FAC+).

Agricultural Ditches
Agricultural ditches, totaling 1.23 acres, were delineated on Bacon Island, Holland Tract, and provisionally estimated on Mandeville Island. We are assuming that the hydrology in these areas is artificial. Indicators of wetland hydrology included inundation, sediment deposits, and drainage patterns in wetlands.

1 Adjacency / Hydrological Connection to Corps Jurisdictional Waters of the United States

A = "adjacent" due to definition in 33 CFR part 328.

C = Contiguous with, or located within, the listed feature.

D = Connected by ditch or other drainage feature.

CV = Connected, directly or indirectly, by culvert or storm drain.

F = Connects by surface flow during flood events.

4.5.2 Regulatory Setting

4.5.2.1 Federal

The following federal laws and regulations related to terrestrial biological resources are applicable to the Project; they are described in Section 4.4:

- Federal ESA
- Clean Water Act Sections 401 and 404
- Rivers and Harbors Act, Section 10
- Migratory Bird Treaty Act (MBTA)

Clean Water Act, Section 401

California regulates discharges of fill and dredged material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. The appropriate Regional Water Quality Control Board, in this case the Central Valley RWQCB, must issue a Water Quality Certification for discharges requiring Corps permits for fill and dredge discharges remains a core responsibility.

Rivers and Harbors Act, Section 10

Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.) requires authorization from the Corps for the construction of any structure in or over any navigable water of the United States, the excavation/dredging or deposition of material in these water or any obstruction or alteration in a navigable water. Structure or work outside the limits defined for navigable waters of the U.S. require a §10 permit if the structure or work affects the course, location, condition, or capacity of the water body.

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956) implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing or possessing migratory birds is unlawful. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Projects that are likely to result in take of birds protected under the MBTA require the issuance of take permits from the local FWS jurisdiction. Birds protected under the act include all common songbirds, waterfowl, shorebirds, hawks, owls, eagles, ravens, crows, native doves and pigeons, swifts, martins, swallows and others, including their body parts (feathers, plumes etc), nests, and eggs. A complete list of protected species can be found at 50 CFR 10.13.

4.5.2.2 State

The following state laws and regulations related to terrestrial biological resources are applicable to the Project; CESA is described in Section 4.4:

- CESA
- California Fish and Game Code/Native Plant Protection Act
- California Fish and Game Code Section 1600 (Streambed Alteration Agreement)
- California Fish and Game Code Section and 3513 (Protection of Birds)

Native Plant Protection Act

The California Native Plant Protection Act (NPPA) of 1977 (Fish and Game Code Section 1900-1913) directed the DFG to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State."

Fish and Game Code Section 1600

The DFG exercises jurisdiction over wetland and riparian resources associated with rivers, streams, and lakes under California Fish and Game Code Sections 1600 to 1607. DFG has the authority to regulate work that will substantially divert, obstruct, or change the natural flow of a river, stream, or lake; substantially change the bed, channel, or bank of a river, stream, or lake; or use material from a streambed. Areas subject to DFG's jurisdiction over rivers, streams, creeks or lakes are usually bounded by the top-of-bank or the outermost edges of riparian vegetation.

California Fish and Game Code Sections 3503, 3503.5, 3513

The nest or eggs of any bird, except those species otherwise excluded by Fish and Game Code, are protected from take by Fish and Game Code Section 3503.

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

Additionally, all migratory nongame birds are protected in Code Section 3513, which states that "It is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act."

4.5.2.3 Regional and Local Plans, Policies, Regulations, and Ordinances

The East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan (Jones & Stokes 2006) does not cover any portion of the 2-Gates Project area. The SJMSCP (2000) covers all of San Joaquin County, so portions of the Project fall within the SJMSCP area. The proposed Project activities, however, would not be "covered activities" under the SJMSCP:

> Activities involving tidally influenced wetlands, jurisdictional wetlands or Other Waters of the United States are not covered by the SJMSCP until and unless a programmatic general permit or its equivalent is secured from the Corps (see SJMSCP 2000 Section 5.6 for additional details). However, pursuant to Section 8.2.4, a Project Proponent may, with authorization from the Corps and acquisition of a Section 404 permit, use the SJMSCP to mitigate impacts to SJMSCP 2000 Covered Species. (SJMSCP, Section 8.2.2.1G)

A programmatic general permit from the Corps has not been issued. Therefore, while the Project falls within the SJMSCP area, the Project is not covered by the SJMSCP.

The following plans related to biological resources are applicable to the Project:

Contra Costa County General Plan (Contra Costa County 2005)

As discussed in Section 4.4, Contra Costa County considers Connection Slough and Old River to be SERAs, which are defined by one or more of the following characteristics: (1) areas containing rare, threatened and endangered species; (2) unique natural areas; and (3) wetlands and marshes.

Relevant Conservation Element Policies include:

> 8-3. Watersheds, natural waterways, and areas important for the maintenance of natural vegetation and wildlife populations shall be preserved and enhanced.

> 8-6. Significant trees, natural vegetation, and wildlife populations generally shall be preserved.

8-9. Areas determined to contain significant ecological resources, particularly those containing endangered species, shall be maintained in their natural state and carefully regulated to the maximum legal extent. Acquisition of the most ecologically sensitive properties within the County by appropriate public agencies shall be encouraged.

8-10. Any development located or proposed within significant ecological resource areas shall ensure that the resource is protected.

8-15. Existing vegetation, both native and non-native, and wildlife habitat areas shall be retained in the major open space areas sufficient for the maintenance of a healthy balance of wildlife populations.

8-17. The ecological value of wetland areas, especially the salt marshes and tidelands of the bay and delta, shall be recognized. Existing wetlands in the County shall be identified and regulated. Restoration of degraded wetland areas shall be encouraged and supported whenever possible.

8-24. The County shall strive to identify and conserve remaining upland habitat areas which are adjacent to wetlands and are critical to the survival and nesting of wetland species.

8-84. Riparian resources in the Delta and along the shoreline shall be protected and enhanced.

8-86. Existing native riparian habitat shall be preserved and enhanced by new development unless public safety concerns require removal of habitat for flood control or other public purposes.

8-92. Revegetation of a watercourse shall employ native vegetation, providing the type of vegetation is compatible with the watercourse's maintenance program and does not adversely alter channel capacity.

8-93. Particular care shall be exercised by development proposals to preserve and enhance riparian corridors along creeks which connect to the freshwater marsh segments of coastal areas in the North Central and East County areas.

San Joaquin County General Plan (San Joaquin County 1992)

Relevant vegetation and wildlife habitat policies included in the Resources Element are as follows:

1. Resources of significant biological and ecological importance in San Joaquin County shall be protected. These include wetlands; riparian areas; rare, threatened and endangered species and their habitats as well as potentially rare or commercially important species; vernal pools; significant oak groves and heritage trees.

2. No public action shall significantly diminish the wildlife and vegetative resources of the County; cumulatively significant impacts shall be avoided.

3. The County shall encourage the protection of those habitat areas that are of a size or quality so that they are no more than minimally affected by adjacent development. Connection of habitat areas shall be encouraged.

5. No net loss of riparian or wetland habitat or values shall be caused by development.

6. Development projects which have the potential to destroy wetlands shall not be permitted, unless:

a. no suitable alternative site exists for the land use, and the use is considered necessary to the public;

b. there is no degradation of the habitat or numbers of any rare, threatened, or endangered plant, or animal species as a result of the project; and

c. habitat of superior quantity and superior or comparable quality will be created or restored to compensate for the loss.

7. The County shall support feeding areas and winter habitat for migratory waterfowl.

8. Strips of land along waterways shall be protected for nesting and foraging habitat and for protection of waterway quality.

10. Use of the Delta channel islands for levee materials or deposition of dredge spoils shall be strongly discouraged.

11. Fisheries shall be protected by:

a. designing and timing waterway projects to protect fish populations; and

b. operating water projects to provide adequate flows for spawning of anadromous fish.

15. Replacement vegetation generally shall be native vegetation. Landscaping with native trees and shrubs shall be encouraged in urban areas to provide suitable habitat for native wildlife, particularly in proposed open space uses of future development.

16. Habitat that is required to be protected, restored, or created as mitigation for a project's impacts shall be monitored and maintained in accord with a County approved program.

4.5.3 Impacts and Mitigation Measures

4.5.3.1 No Project Alternative

The No Project alternative would not affect terrestrial species because no development would occur.

4.5.4 2-Gates Project

Suitable habitat for mammals, including ground squirrels, voles, mice, gophers, weasels, and foxes, as well as for reptiles, including the gopher snake, garter snake, and striped racer, is present within the Project sites. Project construction activities that could disturb these animals include the storage or removal of existing structures and debris, and disposal of dredge spoils. Vehicle movement, grading, and installation of sheet piles and the gate structures could have temporary effects on existing habitat and on animal activity.

These land-based disturbances would be limited to a relatively small area and would be confined to a period starting in October and lasting five weeks into November. Short-term effects on habitat used by reptiles and burrowing mammals would be followed by recolonization of those areas disturbed during construction. Therefore Project construction would have a less than significant impact on burrowing mammals and reptiles. Project activities are also unlikely to affect commonly occurring birds such as red winged blackbird, tree swallow, killdeer, black-necked stilt, great egret and sora because construction would occur outside of the nesting season of most birds (mid-March to late July). Gate operations would not affect nesting and foraging habitat, since operations are not expected to disturb habitat, and birds within and in the vicinity of operations would presumably be habituated to daily operations. Gate removal would take place from the water, so no impacts to commonly occurring mammals, reptiles and birds are anticipated.

Project activities could have temporary effects on aquatic mammals, including river otter, common muskrat, and beaver at both the construction and removal stages of the Project, if those animals were present. However, Project installation and removal activities would have a less than significant impact on these animals since they would not involve actions that could pose a direct or indirect threat to these mobile animals. Additionally, Project activities would not have permanent impacts on their aquatic habitat and would affect only a limited area.

a) 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 California Department of Fish and Game or the U.S. Fish and Wildlife Service

Impacts of the Project on special-status animal and plant species are described below. Mitigation measures BIO 1 through BIO-9 are proposed to reduce the potential impacts of the Project to special-status animal and plant species to a less-than-significant level. No impacts on other federally listed, proposed, or candidate terrestrial species or destruction or adverse modification of proposed or designated critical habitat would occur as a result of Project implementation.

4.5.4.1 Giant Garter Snake

Less than Significant with Mitigation Incorporated. Habitat suitable for GGS is present at both gate locations and the Holland Tract alternate storage site. The Project sites are within habitat designated for the recovery of the species, and GGS is assumed to be present. Construction of the Project has the potential to take individual snakes if they are present in the area subject to disturbance. GGS are active during the summer (season defined as May 1 to September 30) and hibernate in upland burrows and refugia during the winter (season defined as October 1 to April 30). During the active period for GGS, a take of snakes could occur during the

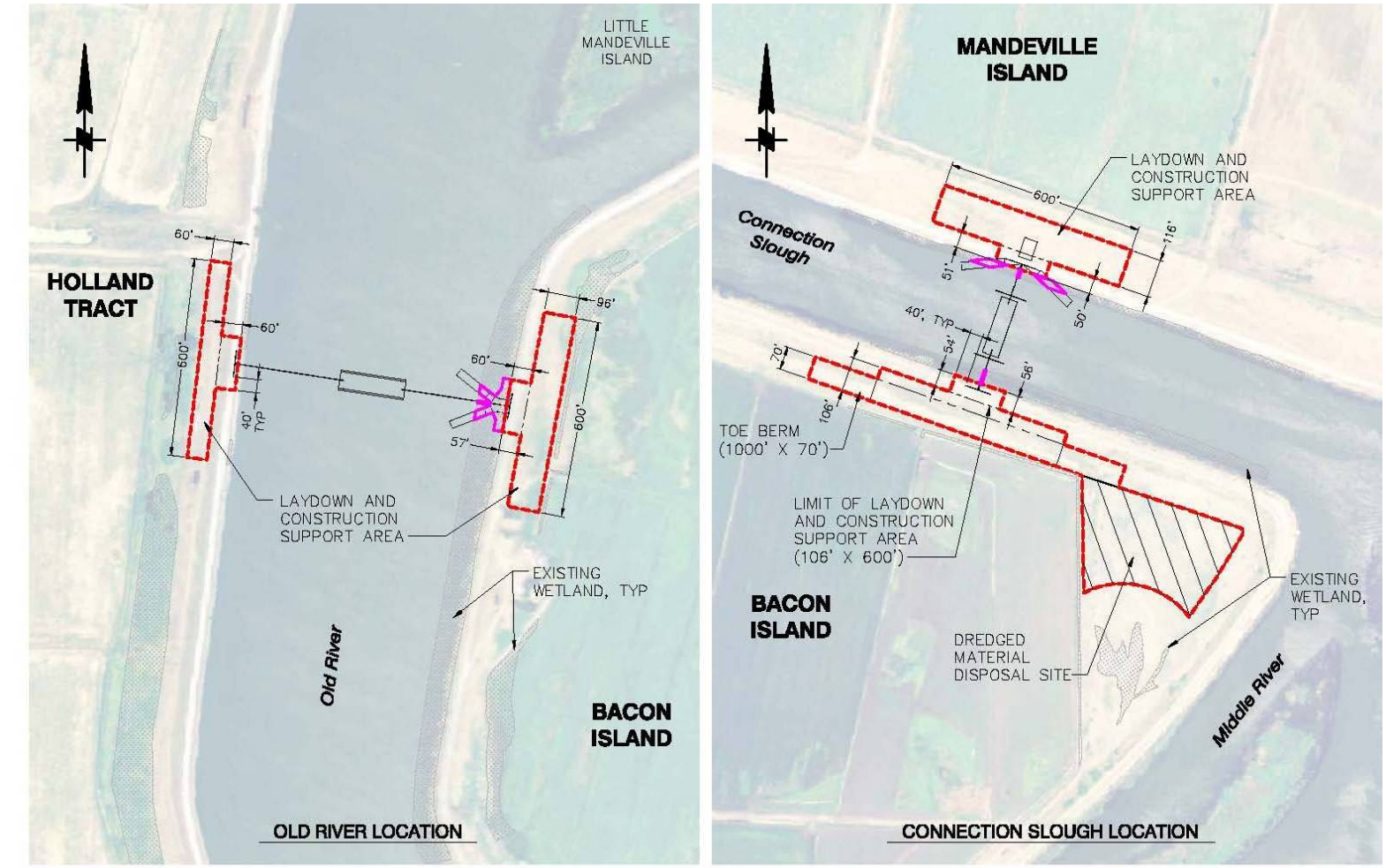
movement of construction equipment and other vehicles, the removal of debris, rock and vegetation, grading, deposition of dredge spoils and by the installation of the sheet piles and the gate structures. During the dormant period, GGS could be crushed or entombed during grading, the installation of the sheet piles on the levees, dredge spoil disposal and the removal of debris or rock in which snakes could be hibernating, or hibernating snakes could be exposed during earthwork.

Project construction may result in a temporary loss of habitat for GGS as upland refugia and burrows suitable for hibernation may be crushed by earthmoving equipment, and debris piles that function as upland refugia are removed from within the laydown areas to accommodate construction activities. This would be a short-term impact to habitat as burrowing mammals would likely recolonize areas disturbed during construction. The most significant land-based disturbance would occur during construction starting in October (during the dormant season) and lasting five weeks into November.

Figure 4.5-4 shows the areas of upland and aquatic GGS habitat that would be impacted during gate construction. Upland habitat included areas above the high tide line subject to disturbance during construction, while aquatic habitat included areas of emergent vegetation within the project construction area. At the Old River gate location, approximately 2.60 acres of upland habitat and 0.18 acres of aquatic habitat would be affected during construction, while at the Connection Slough gate, approximately 6.94 acres of upland habitat and 0.08 acres of aquatic habitat would be affected during construction.

Installation of the barge and gates during November and December would involve access along the roads, but would not impact GGS because there would be no earthmoving work that could disturb, expose or entomb GGS hibernating in upland refugia, and GGS would not be present above ground on roadways.

Project operations would not affect GGS or impede their movement. The snakes are highly mobile and would be able to move around the sheet piles on the levees.



GIANT GARTER SNAKE HABITAT IMPACT AREAS

SCALE: 1" = 400'

LEGEND

UPLAND GIANT GARTER SNAKE HABITAT IMPACT AREA

AQUATIC GIANT GARTER SNAKE HABITAT IMPACT AREA

0 0.5 1
ORIGINAL SCALE

IMPACT AREAS

	UPLAND		AQUATIC	
	(SF)	(AC)	(SF)	(AC)
OLD RIVER – WEST	45,660	1.05	0	0
OLD RIVER – EAST	67,375	1.55	8,005	0.18
TOTAL OLD RIVER	113,035	2.60	8,005	0.18
CONNECTION SLOUGH – SOUTH	224,825	5.16	290	0.01
CONNECTION SLOUGH – NORTH	77,670	1.78	3,165	0.07
TOTAL CONNECTION SLOUGH	302,495	6.94	3,455	0.08

Figure 4.5-4 Giant Garter Snake Habitat Impact Areas

By implementing Mitigation Measure BIO-**1**, the Project Proponent would reduce the potential for impacts on giant garter snake to a less-than-significant level.

Mitigation Measure BIO-1: Avoidance, minimization, and mitigation measures for GGS include the conduct of preconstruction surveys, biological monitoring during construction, and the implementation of the following protection measures by the Project Proponent:

Mitigation Measures (a) through (j) will be applied regardless of the timing of construction activities:

a. Movement of heavy equipment will be confined to existing roadways and the construction work areas defined on project plans and Figure 4.5-4 to minimize habitat disturbance

b. Clearing will be confined to the minimum area necessary to facilitate construction activities. GGS habitat adjacent to the project area will be flagged and designated as Environmentally Sensitive Areas and will be avoided by all construction personnel.

c. Construction personnel will receive Service-approved worker environmental awareness training from a USFWS-approved biologist. The training shall include a description of the GGS, including natural history and habitat, a review of the state and federal listing of the species, the general protection measures to be implemented to protect the species, and a delineation of the limits of the work areas. Employees also shall be required to sign documents stating that they understand that the taking of listed species and destruction or damage of their habitat could be a violation of state and federal law.

d. 24-hours prior to construction activities, the project area will be surveyed for giant garter snakes. Surveys of the project area will be repeated if a lapse in construction activity of two weeks or greater occurs.

e. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Any sightings and any incidental take will be reported to the Service and CDFG immediately.

f. At the end of the 2-Gates Project, terrestrial and wetland habitat disturbed during construction and removal of the gates shall be restored to pre-Project conditions. Restoration work may include replacing rip-rap removed during construction and replanting or seeding with plant species that were removed during construction and removal activities.

g. If the species is observed at the construction site at any time during construction or operations, work shall cease immediately within 200 feet of the area until the snake leaves the work area under its own volition and is out of harm's way. USFWS and DFG shall be contacted immediately.

h. A monitoring report of all activities associated with surveys and mitigation for this species shall be submitted to DFG and USFWS no later than one month after land-based construction is completed.

i. Not less than 48 hours prior to the start of any construction activities, including the removal of the structures, the USFWS-approved biologist shall monitor the installation of exclusionary fencing around the terrestrial portion of the area subject to disturbance. The fencing shall contain one-way exits so snakes within the fenced area will be able to escape but not reenter. Habitat features suitable for GGS within the perimeter of the fence shall be removed under the direct supervision of the USFWS-approved biologist, and any snake detected shall be allowed to leave on its own accord. The USFWS and DFG shall be notified within 24 hours of any GGS (living or dead) observed during Project construction.

j. In order to minimize the effects of loss and disturbance of habitat on giant garter snakes, habitat will be replaced based on the acreage and on the duration of disturbance. Compensation for the loss of upland habitat shall be achieved through the restoration of upland refugia, the acquisition of suitable habitat offsite, and/or the purchase of conservation credits. The acreage of restored and preserved habitat will be determined through consultation with the DFG and USFWS, taking into account the time of year when construction activities occur and the quality of on-site habitat and off-site compensatory habitat. Table 4.5-6 below summarizes GGS habitat conservation measures.

In addition to Mitigation measures (a) through (j), Mitigation measure (k) through (l) will be applied for land-based construction during the active season for GGS:

k. Construction related activities shall require daily monitoring during the active season for GGS. All land-based disturbance and channel/water work shall be monitored by a USFWS-approved biologist, and a visual survey shall be conducted every morning prior to equipment moving to avoid crushing animals. When possible, habitat features useful to GGS shall be avoided or removal shall be closely monitored by the USFWS-approved biologist. Habitat features include rip-rap, rodent burrows, debris piles, and dense vegetation.

l. There is a potential that trapping surveys may be effective in some areas of the Project site, and may be implemented upon approval of this method by DFG and the USFWS.

In addition to Mitigation measures (a) through (j), Mitigation measures (m) through (n) will be applied if land-based construction occurs during the dormant season for GGS:

m. A USFWS and DFG-approved captive salvage facility shall be identified prior to the start of ground disturbance. If during construction a live GGS is detected that is unable to leave the Project area safely on it's own accord, the permitted biologist shall immediately contact the USFWS and DFG to determine whether or not to capture and protect the snake, taking in to consideration the weather, time of year, condition of the snake and where it was caught. If the USFWS and DFG direct the permitted biologist to capture and protect the snake, it shall be moved to the approved facility until it can be released during the active season (May 1 to September 30) to suitable habitat outside the area of disturbance. The USFWS and DFG shall be notified within 24 hours of any GGS observed during Project construction.

n. Twenty-four hours prior to the start of construction activities, a qualified biologist in possession of a recovery permit for GGS shall conduct a preconstruction survey of the site. The permitted biologist shall monitor all initial site disturbance, including vegetation clearing, the removal of piles of debris, construction materials, agricultural equipment, riprap along the levees, and other materials that may provide suitable upland refugia for GGS. The biologist shall monitor all initial site disturbances in areas where small mammal burrows or subsurface features that provide hibernation habitat are present. The biologist shall have the authority to direct the excavation of suitable hibernation habitat in a manner that will maximize the potential for live salvage and minimize the risk that snakes will be crushed or wounded.

Table 4.5-6 Summary of Giant Garter Snake Conservation Measures

	Impacts: Duration/Time of Year	Impacts: Acres	Conservation Measure: Compensation
Level 1	1 season	Less than 20 and temporary	Restoration
Level 2	2 seasons	Less than 20 and temporary	Restoration plus 1:1 replacement
Level 3	More than 2 seasons and temporary	Less than 20 and temporary	3:1 Replacement (or restoration plus 2:1 replacement)
	Permanent loss	Less than 3 acres total giant garter snake habitat And Less than 1 acre aquatic habitat; Or Less than 218 linear feet bank habitat	3:1 Replacement
Level 4	Construction during dormant season	Less than 20 and temporary	Restoration and up to 6:1 replacement

4.5.4.2 Western and Northwestern Pond Turtle

Less than Significant with Mitigation Incorporated. Western pond turtle (and the subspecies, northwestern pond turtle) has been documented to occur in the canal west of the Old River site on Holland Tract, on the channel islands north of the Old River study area, and to the south, on Old River. Construction and removal of the Project facilities may impact western or northwestern pond turtles if present within the Project area. Project operations would not affect these organisms since operations would not alter their habitat or involve actions that could pose a direct or indirect threat to these mobile animals. By implementing Mitigation Measure BIO-2, the Project Proponent would reduce the potential for impacts on WPT to a less-than-significant level.

Mitigation Measure BIO-2: The Project Proponent will implement the following measures to minimize potential impacts on WPT:

a. Not more than 48 hours prior to the start of site disturbance, a qualified biologist familiar with WPT behavior shall conduct focused visual surveys for western pond

turtles and any nesting activity (i.e., nests, egg shell fragments) on the Project site. Preconstruction surveys shall include available nesting habitats within 1,319 feet of suitable aquatic habitats that will be impacted during construction or removal of the Project. After the preconstruction surveys, silt fencing, buried not less than 6 inches at the base, will be installed around the perimeter of the laydown area, and the removal of vegetation within the laydown areas that is required for Project construction shall be conducted under the direct supervision of the qualified biologist.

b. If juvenile or adult WPT are found aestivating or hibernating on the Project site, construction work will cease within 50 feet of the area and the biologist will move the individuals out of the construction area to suitable habitat prior to resuming construction work. If a nest is found in the construction area, DFG will be notified immediately to determine appropriate measures to protect or relocate the nest. Surveys must be conducted every year in which land-based construction activities occur.

c. A letter report documenting survey methods and findings shall be submitted to DFG following the completion of the preconstruction survey.

d. Before land-based construction, a worker environmental training awareness program shall be conducted by a qualified biologist. The training shall include instruction regarding species identification, natural history, aquatic and upland nesting habitat, the general conservation measures to be implemented to protect the species, and a delineation of the limits of work.

4.5.4.3 Western Burrowing Owl

Less than Significant with Mitigation Incorporated. There are no CNDDB records of burrowing owls, a federal and state species of concern, in the Bouldin Island or Woodward Island topographic quadrangles surrounding the Project area. However, suitable habitat for burrowing owls is present on Bacon Island at Connection Slough, as an abundance of ground squirrel burrows are present in the laydown and spoil disposal areas. Land-based construction activities, including the installation and removal of sheet piles, pile-supported boat ramps, clearing, grading, the storage or movement of rock or other construction materials, or disposal of dredge spoils could result in a direct take of individuals or result in the failure of an active nest, if burrowing owls are present in the disturbance area.

Project operations would not have any impacts on burrowing owls since the operations would not require land-based earthwork.

By implementing Mitigation Measure BIO-3, The Project Proponent would reduce the potential for construction-related impacts on western burrowing owl to a less-than-significant level.

Mitigation Measure BIO-3: Conduct surveys for western burrowing owl and, avoidance or mitigation for owls, if present. The Project proponent will implement the following measures to minimize potential impacts on burrowing owls:

The California Burrowing Owl Consortium's (CBOC) Burrowing Owl Survey Protocol and Mitigation Guidelines (1993) and the DFG Staff Report on Burrowing Owl Mitigation (1995) state that mitigation actions should be carried out from September 1 to January 31. These

documents explain that reproductive timing may vary with latitude and climatic conditions, therefore the Staff Report states that the time frame to carry out mitigation activities should be adjusted accordingly.

a. Surveys consistent with the California Burrowing Owl Survey Protocol and Mitigation Guidelines (CBOC 1993) shall be conducted in all areas where construction-related site disturbance may occur and within a 500-foot buffer of land-based disturbance. A survey to determine if suitable burrows (larger than 3.5 inches diameter) are present in all areas of ground disturbance shall be conducted. If no burrows suitable for burrowing owls are present in areas of ground disturbance then no other activities are necessary to avoid effects to individuals.

b. If suitable burrows are present in the Project area then all areas of ground disturbance (including access roads) shall be surveyed for occupancy by burrowing owls within 30 days of initial ground disturbance. The California Burrowing Owl Survey Protocol and Mitigation Guidelines (CBOC 1993) calls for up to four surveys on four separate days to determine burrowing owl presence or absence.

c. No disturbance shall occur within 250 feet of occupied burrows during the breeding season (February 1 through August 31). If burrowing owls are present within 160 feet of construction during the non-breeding season (September 1 through January 31), a site-specific impact avoidance plan shall be prepared by a burrowing owl biologist[1] and submitted to DFG for approval. The Plan shall describe passive relocation procedures and maintenance of one-way doors during site disturbance, if applicable, and habitat restoration after the Project is completed. Passive relocation procedures shall include the installation of one-way doors in burrow entrances by a qualified biologist. One-way doors shall be left in place not less than 48 hours to ensure that owls have left the burrow prior to excavation of the burrow by the qualified biologist.

d. If construction activities result in the loss of occupied habitat, mitigation consistent with the DFG Staff Report on Burrowing Owl Mitigation Guidelines (1995) shall be provided by permanently protecting not less than 6.5 acres of suitable habitat per pair or unpaired resident owl at a location acceptable to DFG. Long-term management and monitoring of protected habitat acceptable to DFG shall be provided.

e. Before land-based site disturbance, a worker environmental training awareness program shall be conducted by a qualified biologist. The training shall include instruction regarding species identification, natural history, habitat, and protection needs. If the species is observed at the construction site at any time during construction, construction work shall cease within 160 feet of the area until the animal can be moved to a safe location consistent with DFG regulations.

f. A monitoring report of all activities associated with surveys and mitigation for this species shall be submitted to DFG within one month after construction is completed. If owls are observed in the study area, monitoring reports shall be submitted to DFG

[1] A burrowing owl biologist is a wildlife biologist who can demonstrate first-hand knowledge of burrowing owl reproductive behavior and has demonstrable field experience monitoring burrowing owl reproductive behavior during all stages of the nesting cycle (i.e., courtship, egg-laying, incubation, nestling, emergent juvenile and dispersal stages).

before any action is taken. CNDDB reports shall be submitted within one month of each observation with a copy to the local DFG biologist.

4.5.4.4 Swainson's Hawk

Less than Significant with Mitigation Incorporated. Swainson's hawk has been observed foraging on site and could nest in trees on Holland Tract, Bacon Island at Old River and Mandeville Island that are located within 0.25 mile of the Project activities.

Installation of the Project facilities is not likely to affect Swainson's hawk nesting behavior because construction will occur outside of the nesting season (mid-March to late July). Removal of the gates and boat ramps during the in-water work window (July 1 through November 30) will take place toward the end of the nesting season when young birds are active and nest abandonment due to construction disturbance is extremely unlikely, or after the nesting season. However, in the event that nesting is delayed due to cold or wet spring weather, or the first nesting attempt fails and a second nest effort occurs, fledging behavior can be delayed until well into August. Gate removal could affect nesting behavior if it occurs within 0.25 mile of an active nest with young birds that have not fledged.

Project operations would not result in impacts to Swainson's hawk. Nesting and foraging habitat would not be impacted by gate operations, since operations are not expected to disturb habitat, and birds nesting in proximity to the gates would presumably be habituated to ongoing operations since operations would begin prior to the nesting season. By implementing Mitigation Measure BIO-4, the Project Proponent would reduce the potential for construction-related impacts on Swainson's hawk to a less-than-significant level.

Mitigation Measure BIO-4: Conduct preconstruction surveys for Swainson's hawk prior to construction activities and implement avoidance or mitigation activities for Swainson's hawk, if present:

a. Surveys consistent with the Swainson's Hawk Technical Advisory Committee's Recommended Survey Methodology (May 31, 2000) shall be conducted by a wildlife biologist with first-hand knowledge of Swainson's hawk reproductive behavior within 0.25 mile of site disturbance activities such as gate construction or removal if such activities are scheduled to occur between March 15 and September 15.

b. If occupied Swainson's hawk nests are detected within 0.25 mile of site disturbance activities, site disturbance shall be postponed until a qualified nest monitor determines that the young birds have fledged and are no longer reliant on the nest site.

   If site disturbance is proposed within 0.25 mile of an active nest before the young birds have fledged, the Project Proponent shall consult with DFG to determine the appropriate course of action, which may include nest monitoring by a biologist with stop-work authority in the event of disturbances to nesting behavior, and a reduced no-disturbance buffer if site conditions suggest that a reduced buffer area would not disturb nesting behavior (based on amount and type of ongoing disturbance, such as farm activities, boating, traffic, etc.). Additionally, acquisition of a 2081 Permit

from DFG may be required, and the Project Proponent would be required to adhere to any other conditions imposed under the permit.

4.5.4.5 Black Rail

Less than Significant with Mitigation Incorporated. Black rail has been documented to occur in the dense emergent wetland habitat on the islands in Old River and Connection Slough, although no black rail vocal responses were detected during recent surveys by Department of Water Resources (pers. comm. Mike Bradbury, 2009). Nesting and foraging habitat for this species is present in the Project area in the emergent wetland vegetation on the east bank of Old River, although the potential for it to be present in the construction area is low due to the limited extent of this habitat on the bank of the river.

Construction activities will not affect the nesting activities of black rail, because construction activities will occur October through December, outside the nesting season. Removal of the gates and boat ramps between July and November could take place during or after the nesting season. Removal activities could adversely affect the nesting behavior of these species, if occupied nests are present.

Project operations would not result in impacts to black rail. Nesting and foraging habitat would not be impacted by gate operations, since operations are not expected to disturb habitat, and birds nesting in proximity to the gates would presumably be habituated to ongoing operations since operations would begin prior to the nesting season for all species of concern. Gates would be open during flood events, producing less than a 0.1-foot change in flood stage elevations in a 100-year event, so the disturbance of low-lying nesting habitat is unlikely. By implementing Mitigation Measure BIO-5, the Project Proponent would reduce the potential for construction-related impacts on black rail to a less-than-significant level.

Mitigation Measure BIO-5: Conduct preconstruction surveys for black rail prior to gate removal activities and avoidance or mitigation activities, if present:

> Surveys consistent with the Point Reyes Bird Observatory Black Rail Survey Protocol (PRBO undated, Spautz et al 2005) shall be conducted between March 15 and May 31 in the year when gate removal is scheduled. If black rail are detected within 0.25 mile of the gates, measures to avoid impacts to nesting behavior shall be developed in consultation with DFG and implemented. Such measures may include a delay in gate removal until young birds are foraging independently and nest monitoring by a qualified biologist with stop-work authority in the event that gate removal operations posed a risk to nest habitat. Additionally, acquisition of a 2081 Permit from DFG may be required, and the Project Proponent would be required to adhere to any other conditions imposed under the permit.

4.5.4.6 Other Raptors and Migratory Nesting Birds

Less than Significant with Mitigation Incorporated. Suitable nesting habitat for various raptors, as well as other migratory bird species, is present on or near the project site. Numerous species have the potential to nest on site, either in the marsh areas fringing the levees, or within

trees, shrubs and grassland on the landward sides of the levees. These could include the including northern harrier, white-tailed kite, tricolored blackbird, loggerhead shrike, and other birds protected by the MBTA.

Construction activities would not affect the nesting activities because land-based construction activities would occur October through December, outside the nesting season. Removal of the gates and boat ramps between July and November would occur towards the end of or after the nesting season. Removal activities could adversely affect the nesting behavior raptors or other protected species, if occupied nests are present.

Project operations would not result in impacts to protected bird species. Nesting and foraging habitat would not be impacted by gate operations, since operations are not expected to disturb habitat, and birds nesting in proximity to the gates would presumably be habituated to ongoing operations since operations would begin prior to the nesting season for all species of concern. Gates would be open during flood events, producing less than a 0.1-foot change in flood stage elevations in a 100-year event, so the disturbance of low-lying nesting habitat is unlikely. By implementing Mitigation Measure BIO-6, the Project Proponent would reduce the potential for construction-related impacts on nesting birds to a less-than-significant level.

Mitigation Measure BIO-6: Conduct preconstruction surveys for nesting birds prior to construction activities and implement avoidance or mitigation activities for nesting birds, if present:

> If site disturbance commences between February 15 and August 15, a pre-construction survey for nesting birds shall be conducted by a qualified wildlife biologist. If nests of either migratory birds or birds of prey are detected on or adjacent to the site, a no-disturbance buffer in which no new site disturbance is permitted shall be fenced with orange construction fencing or equivalent, and the buffer shall be observed until August 15, or the qualified biologist determines that the young are foraging independently or the nest has failed. The size of the no-disturbance buffer shall be determined by a qualified wildlife biologist in consultation with DFG and the USFWS, and shall take in to account local site features and pre-existing sources of potential disturbance. If more than 15 days elapses between the survey and site disturbance, the survey shall be repeated.

4.5.4.7 Plants

Less than Significant with Mitigation Incorporated. Of the nine rare plants determined to have a potential to occur on the study area, seven are summer blooming plants, and one species, eel-grass pondweed, is distinguishable from other pondweed by its vegetative parts. A summer rare plant survey was conducted at the Old River site on September 23, 2008 and on the Bacon Island side of the Connection Slough site on September 29, 2008. A spring survey of the Old River and the Bacon side of the Connection Slough site was undertaken on June 24, 2009. Three rare plants were observed within the study area: brown fox sedge, woolly rose-mallow, and Suisun Marsh aster.

Individual special-status plants present within the development envelope of the Project could be negatively impacted by work conducted within the Project area. By implementing Mitigation

Measure BIO-7, the Project Proponent would reduce the potential for construction-related impacts on special-status plants to a less-than-significant level.

Mitigation Measure BIO-7: Conduct preconstruction surveys for rare plants, and, avoidance or mitigation for rare plants, if present:

a. Rare plant surveys, timed to coincide with the flowering period of target species (spring and summer) shall be conducted to determine if any special-status plant species are present within the study area. Spring and summer surveys have already been conducted on a portion of the Holland Tract study area and on all of the Bacon Island study area.

b. If rare plants are present within the development area of the Project, the feasibility of avoidance shall be evaluated. Avoidance would include the installation of orange construction fencing around the plants prior to site disturbance and ensuring that rare plants are not disturbed during construction. The spring and summer-blooming rare plants observed within the study area to date would be afforded protection by this measure.

c. If surveys timed to coincide with the flowering period for target species cannot be performed for any reason, including a lack of access to the site, presence shall be assumed. Prior to construction, a thorough search for plants sharing the vegetative characteristics of target species shall be made and if present, those plants shall be assumed to be the sensitive species. Individual plants found shall be subject to the measures described in (d), below.

d. If avoidance is not feasible, a mitigation plan, approved by DFG, shall be developed and implemented, including, but not restricted to the following measures: (1) the number and area of rare plants affected by the Project shall be measured and documented; (2) affected plant(s) shall be transplanted to a suitable nearby area or seed shall be collected and sown on a nearby area possessing similar habitat characteristics (one possible site is the Wildlands Inc. marsh restoration area located on Holland Tract or the in-channel islands protected as sanctuaries by the Delta Wetlands Project); (3) mitigation plantings shall be monitored for survival, plant numbers and area for a period of five years. .

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service.

Less than Significant with Mitigation Incorporated. Project construction would occur within ruderal herbaceous and wetland habitats only. Project designs specifically avoid mixed riparian woodland and seasonal wetland habitats present on Holland Tract and Bacon Island in the Old River site. Impacts to ruderal herbaceous and freshwater marsh wetland habitats on the Connection Slough Site have been minimized through the location and design of the project. There is no mixed riparian habitat located in the Connection Slough construction area. Project plans avoid disturbance of riparian vegetation and minimize impacts to sensitive wetland communities. Sensitive riparian and wetland habitats near the Project site could be impacted however, through the inadvertent disturbance of adjacent areas outside the construction footprint of the Project during construction and removal.

By implementing Mitigation Measure BIO-8, the Project Proponent would render the impact of the project on riparian habitat and other sensitive natural communities to a level of less-than-significant.

Mitigation Measure BIO-8: Orange construction fencing shall be installed around the perimeter of sensitive wetland and riparian habitats adjacent to the landward footprint of the Project to prevent the movement of construction equipment into these sensitive areas during construction. A biological monitor shall make weekly inspections of the fencing during construction and shall notify the construction team if fence maintenance is needed.

c) 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.

Less than Significant with Mitigation Incorporated. Implementation of the Project would result in the discharge of approximately 1.63 acres of fill into potentially jurisdictional waters of the United States, including wetlands and other waters subject to Corps jurisdiction under the federal Clean Water Act, and Section 10 of the Rivers and Harbors Act. Construction of the pier-supported boat ramps would require the discharge of fill to Coastal and Valley Freshwater Marsh wetlands as well as unvegetated waters of the U.S. The boat ramps would also result in the temporary conversion of approximately 0.18 acre of freshwater marsh wetland habitat to unvegetated waters of the U.S. due to shading and the loss of vegetated cover during the demonstration Project. Construction of the gates would require the excavation of unvegetated waters of the U.S. and the discharge of fill in other waters of the U.S. associated with the rock fill surrounding the barge and the installation of the barge. Seasonal wetlands in the laydown areas and in the spoil disposal area would be avoided. Impacts to wetlands and other waters have been minimized by the use of sheet piles rather than rock dikes to span the channels to the barges.

By implementing Mitigation Measure BIO-9, the Project Proponent would reduce impacts on jurisdictional waters of the United States to a less-than-significant level. Table 4.5-5 (above) provides estimates of the maximum impacts on potentially jurisdictional waters of the U.S.

Mitigation Measure BIO-9: Mitigation for the discharge of fill to wetland habitats shall meet the requirements established by the Corps, RWQCB, and DFG and may include one or more of the following:

a. The barges, in-river sheet piles and a portion of the rock placed around the barges to hold them in place shall be removed at the termination of the demonstration Project. The 0.18 acre of freshwater marsh wetland converted to other waters by the shading effect of the boat ramps and the 0.0023 acre of freshwater marsh habitat fill by the piers for the boat ramp shall be restored through the removal of the boat ramps and piers, and the replanting of native plant materials to restore freshwater marsh vegetative habitat to the site.

b. The discharge of fill to wetlands and other waters due to construction of the Project may be mitigated through the purchase of wetland mitigation credit at an approved

wetland mitigation bank or through the approval and implementation of a wetland mitigation and monitoring plan.

c. Orange construction fencing shall be installed around the perimeter of wetlands and other waters in proximity to construction activities to prevent accidental disturbance during construction.

Additionally, the Project Proponent will be required to obtain a CWA Section 404 Permit, Section 401 Water Quality Certification, and Streambed Alteration Agreement, and will comply with any further mitigation measures that are imposed by the regulatory agencies in the process of issuing these permits.

d) 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.

No Impact. The Project would not interfere with the movement of terrestrial wildlife species or movement corridors once the construction activities are completed. All terrestrial special-status species with potential to occur within the Project area are highly mobile and would be able to move around the gates. Periods of operation are expected to have minimal impacts on the movement of terrestrial wildlife.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

No Impact. The Project would not conflict with any of the policies or goals described in the Contra Costa County General Plan (2005) or the San Joaquin County (1992) General Plan because mitigation measures would be implemented that would reduce or avoid significant impacts.

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

No Impact. The East Contra Costa County Habitat Conservation Plan and Natural Community Conservation Plan (Jones & Stokes 2006) boundaries exclude the 2-Gates Project area. The SJMSCP (2000) covers the entire San Joaquin County, so portions of the Project fall within the SJMSCP area. The activities proposed under the, however, would not be "covered activities" under the SJMSCP, and the Project would not conflict with the goals of the plan.

4.5.4.8 Cumulative Impacts

The Project would result in number of significant impacts on sensitive plant and wildlife species, and it is likely that a number of other projects in the area including, but not limited to, the Rock Slough Fish Screen, would result in similar impacts to sensitive species. The cumulative impact would be significant, but the Project's contribution to this cumulative impact would be reduced to less than significant by implementation of the above mitigation measures, which would fully offset the effects of the Project on terrestrial species and wetlands. Other projects would be required to implement similar mitigation measures, further reducing the potential for cumulative impacts.