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, 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 (CNDDB September 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, December 2001), and correspondence from the Natural Resources Conservation

Service (April 2, 2002), Jones & Stokes (April 19, 2002) and the Sacramento District of the 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, Connection Slough, and the Holland Alternate Storage sites on Holland Tract and Bacon Island. 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 B.

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.

Figure 4.5-1 Habitats on the Old River Study Area

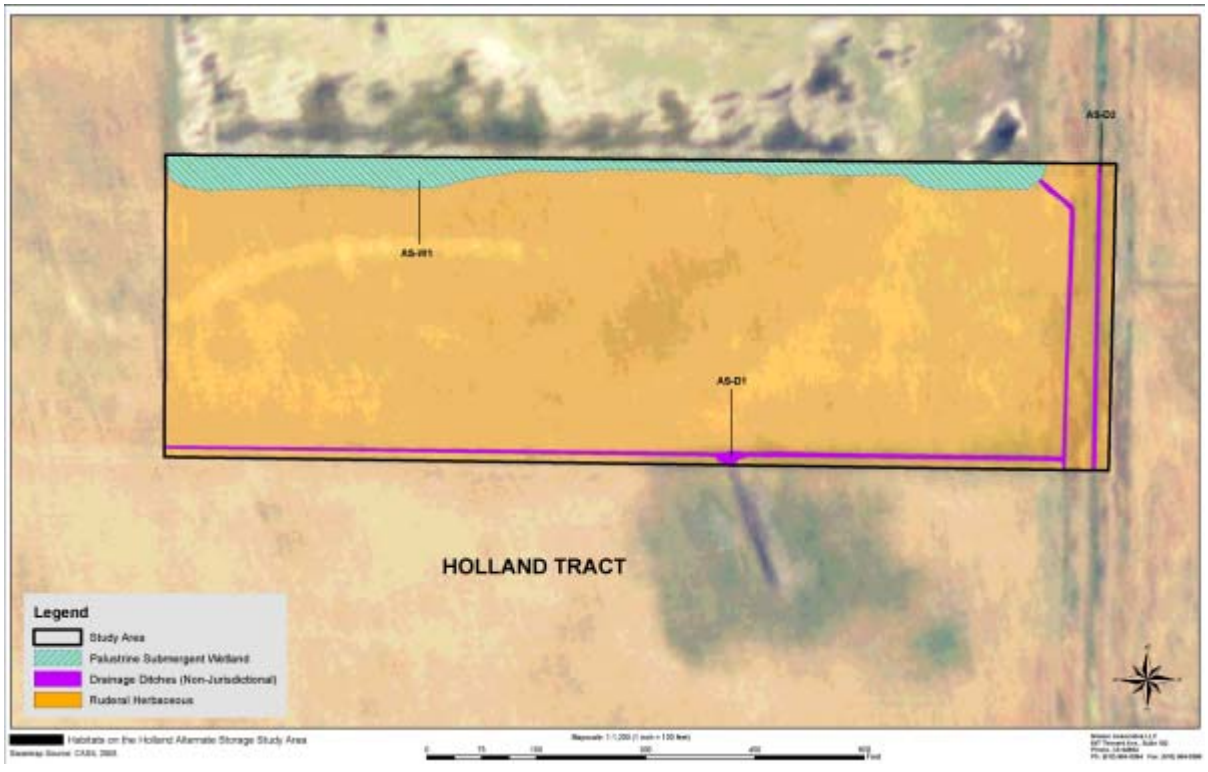

Figure 4.5-2 Habitats on the Holland Alternate Study Area

Figure 4.5-3 Habitats on the Connection Slough Study Area

Summer rare plant surveys for late-blooming species at the Old River, Holland Alternate Storage 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). Summer rare plant survey results are reported in the Summer Rare Plant Survey, Two Gates Project Locations (Mosaic Associates, September 30, 2008), enclosed in Appendix C.

A habitat assessment for the federally and state threatened giant garter snake (*Thamnophis gigas*) was conducted by Swaim Biological, Inc. The 2-Gates Project Habitat Assessment for the Giant Garter Snake (*Thamnophis gigas*), (Swaim Biological, September 30, 2008) is enclosed in Appendix D.

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 February 2009 and April 2009). 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 are enclosed in Appendix E.

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, and open space. There are several unused structures (old farmhouses) located on Bacon Island in the Old River location; a large barn is located on Holland Tract. There is a structure visible on aerial photography at 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, though 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*) and 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'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 did occur in the basin or near the margin included Bermuda grass, umbrella sedge (*Cyperus eragrostis*), knotweed (*Polygonum arenastrum*), and an unidentified plant that may be 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, 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 14 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 site visits in the Old River and Connection Slough sites included Swanson'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.) 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 (*Agelaius phoeniceus*), tree swallow (*Tachycineta bicolor*), barn swallow (*Hirundo rustica*), 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*).

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 site and in the vicinity.

Table 4.5-1 Federally Listed and State-Listed Terrestrial Wildlife Species with Potential to Occur on the Project Site

Common Name	Scientific Name	Listing Status[1]		Designated Critical Habitat	Critical Habitat on Project Site	Effects Determination[2]
		Federal	State			
Invertebrates						
Conservancy fairy shrimp	*Branchinecta conservatio*	FE		Yes	No	No effect
Longhorn fairy shrimp	*Branchinecta longiantenna*	FE		Yes	No	No effect
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	--	Yes	No	No effect
Delta green ground beetle	*Elaphrus viridis*	FT		Yes	No	No effect
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE		Yes	No	May affect
Amphibians						
California tiger salamander	*Ambystoma californiense*	FT	SSC	Yes	No	No effect
California red-legged frog	*Rana aurora draytonii*	FT		Yes	No	No effect
Reptiles						
Alameda whipsnake	*Masticophis lateralis euryxanthus*	FT	ST	Yes	No	No effect
Giant garter snake	*Thamnophis gigas*	FT	ST	No	No	May affect
Birds						
Swainson's hawk	*Buteo swainsoni*	FSC	ST	No	No	May affect. Observed foraging on Bacon Island, 9/8/08. 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	May affect. 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	No effect
Bank Swallow	*Riparia riparia*	--	ST	No	No	No effect
Mammals						
San Joaquin kit fox	*Vulpes macrotis mutica*	FE	ST	No	No	No effect

Note: Species list 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.

[2]A "may affect" determination indicates that suitable habitat was present, there was potential for the species to occur, and that construction, removal or operation of the Project had the potential to affect the species. A "no effect" determination indicates that suitable habitat is not present or that there is no potential to occur due to other factors described below, and that the Project would not affect the species.

1

Table 4.5-2 Federal and State Terrestrial Wildlife Species of Concern with Potential to Occur in the Project Site

Common name	Scientific name	Listing Status1		Documented to Occur in Project Site	Effects Determination2
		Federal	State		
Reptiles					
Western pond turtle	*Actinemys marmorata*	–	SSC	Yes, in three locations 2002	May affect
Northwestern pond turtle	*Actinemys marmorata marmorata*	–	SSC	No	May affect
Silvery legless lizard	*Anniella pulchra pulchra*	–	SSC	No	No effect
Birds					
Tricolored blackbird	*Agelaius tricolor*	–	SSC	No	May affect
Burrowing owl	*Athene cunicularia*	–	SSC	No	May affect
Loggerhead shrike	*Lanius ludovicianus*	–	SSC	No	May affect
Mammals					
Western red bat	*Lasiurus blossevillii*	–	SSC	No	No effect

Note: Species list for the Brentwood, Woodward Island, Bouldin Island, and Jersey Island quadrangles, which contain the Project sites.

1Listing status definitions: FSC = federal species of concern; SSC = state species of special concern.

2 A "may affect" determination indicates that suitable habitat was present, there was potential for the species to occur, and that construction, removal or operation of the Project had the potential to affect the species. A "no effect" determination indicates that suitable habitat is not present or that there is no potential to occur due to other factors described below, and that the Project would not affect the species.

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 February and April 2009). 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.

AMPHIBIANS AND REPTILES

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

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 [*Psudacris 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.

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. The wetlands directly fringing the riverbank comprise the best GGS habitat on the east of the Old River.

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.

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 Storage Site	Seasonal	Fish present	Present but sparse due to grazing	Present	Present

Western pond turtle has been reported on the Project site and in the Project vicinity; suitable habitat exists on site for this species. Additionally, there is a record for the northwestern pond turtle northeast of the Project site. The western pond turtle 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 and Germano 2008, Spinks and Shaffer 2005). Regardless of the name applied to the species or subspecies, records for western pond turtle exist on the site 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 in the Project site 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 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 area or within 250 feet of the Project area.

California black rails have been documented on the study area within Old River and in Connection Slough, as well as in Middle River. 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 potential to occur on site due to presence of suitable habitat. Habitat suitable for bank swallow (*Riparia riparia*) nesting is absent from the Project site.

Large trees on the Holland Tract, Old River site and possible large trees located on Mandeville Island exist in the study area 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 and other birds of prey. Suitable nesting habitat is present in the riparian scrub and the planted trees for birds covered under the MBTA.

MAMMALS

San Joaquin kit fox (*Vulpes macrotis mutica*) are not expected to occur in the Project site 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 site. Abandoned farmhouse structures on Bacon Island, as well as 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 will 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 site. 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 site.

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
Brown fox sedge *Carex vulpinoidea*	Moderate to High. Documented to occur on study area (Old River). 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*	High. Documented as occurring in islands of Old River in 1992. Has potential to occur on levee margins. Detected on Bacon Island.	–	–	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); 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*	Moderate to High. Documented in Old River north of study area; suitable habitat present in levee margins. Detected on Bacon and Holland.	–	–	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: CNDDB 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. 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 nearby 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: Apri 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.

Special-status plant species surveys are recommended for the Project site. A fall rare-plant survey was conducted on September 23 at the Old River and Alternate Storage locations and on September 29th on the Bacon Island side of Connection Slough. Two species, wooly 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*).

The presence of spring blooming species, including brown fox sedge, round-leaved filaree (*California macrophylla*) and caper-fruited tropidocarpum (*Tropidocarpum capparideum*) could not be ruled out by the results of the September focused surveys because they did not coincide with the flowering period for these species. Eel-grass pondweed, although it flowers in the spring, can be distinguished from other pondweeds by its vegetative structures. The pondweed observed was not *P. zosteriformis*.

It is unlikely that any of these species would be found on the landward side of the levees 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 remaining spring-blooming species with potential to occur are present on the river side of the levees. Brown fox sedge is the only spring-blooming plant with a high potential to occur on the Project site.

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
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

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

	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	1.6315
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:

†Note that a site visit to Mandeville Island was not possible and that the wetland areas 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 B.
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).

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 Area. 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
- MBTA

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 3503.5 (Protection of Birds of Prey)

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.

Birds of Prey

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.

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

The East Contra Costa County Habitat Conservation Plan does not cover any portion of the 2-Gates Project area. The SJMSCP 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 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 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 Plan.

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

Contra Costa County General Plan

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

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

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-6 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 giant garter snake is present at both gate locations and the Holland Tract Alternate Storage site. The Project site is within habitat designated for the recovery of the species, and giant garter snake 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 May 1 to September 30) and hibernate in upland burrows and refugia during the winter (season defined October 1 to April 30). Construction activities and site disturbance between May 1 and September 30 could result in the take of snakes during their active period, if present within the area subject to disturbance.

Project construction may result in a temporary loss of habitat for giant garter snake 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 September (during the active season) and lasting five weeks into October.

Installation of the barge and gates during November 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 giant garter snakes or impede their movement. The snakes are highly mobile and would be able to move around the sheet piles on the levees.

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 giant garter snake will include the following:

Conduct preconstruction surveys for GGS, and if present, implement protection measures. The Project Proponent will implement the following measures to minimize potential impacts on giant garter snake:

(a) All land-based site disturbance, including construction in 2009 and removal in 2014 shall be conducted during the active season for GGS, between May 1 and September 30 when the snakes are active and the risk of direct mortality is lessened. Before any ground-disturbing construction activities begin, the Project proponent will retain a qualified biologist in possession of a recovery permit for GGS to conduct focused surveys to determine the presence or absence of this species on the Project site. At a minimum a visual preconstruction survey will be conducted not more than 24 hours before the start of construction in any portion of the Project site slated for ground-disturbing activities. There is a potential that trapping surveys would be effective in some areas of the Project site and may be implemented upon approval of this method by CDFG and USFWS. Surveys must be conducted every year in which Project construction activities or land-based disturbance occurs.

Construction related activities in the channel/water shall also be monitored by a qualified biologist due to the highly aquatic nature of the GGS during its active season.

(b) Not less than 48 hours prior to the start of any construction activities, including the removal of the structures in 2014, the permitted biologist will monitor installation of exclusionary fencing with one-way exits suitable for GGS around the terrestrial portion of the area subject to site disturbance. Habitat features suitable for GGS within the perimeter of the fence would be removed under the direct supervision of the permitted biologist, and any snakes detected would be relocated to a USFWS and DFG-approved location. The USFWS and DFG will be notified within 24 hours of any GGS (living or dead) observed during Project construction. The exclusionary fencing will be maintained throughout the duration of the Project, or will be reinstalled annually or when deemed necessary by the Project sponsor, the USFWS and DFG. If the fence is reinstalled annually, it should be installed during the active period for GGS, between May 1 and September 30, and will contain one-

way exits so snakes within the fenced area would be able to escape but not reenter. All aquatic construction activities shall also be monitored by a qualified biologist.

(c) Before construction and prior to removal, a worker environmental training awareness program will be conducted by a qualified biologist. The training will 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 or operations, work will cease immediately within 150 feet of the area until the animal can be moved to a safe location consistent with DFG and USFWS regulations, and USFWS and DFG, will be contacted immediately.

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

(e) At the end of the 2-Gates Project, terrestrial and wetland habitat disturbed during construction and operation of the gates shall be restored to pre-Project conditions. Restoration work may include replanting with plant species removed the Project site.

4.5.4.2 Western and Northwestern Pond Turtle

Less than Significant with Mitigation Incorporated. Western pond turtle (or 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 western pond turtle to a less-than-significant level.

Mitigation Measure BIO-2: Conduct preconstruction surveys for western pond turtle, and if present, implement protection measures. The Project Proponent will implement the following measures to minimize potential impacts on western pond turtles:

(a) Not more than 48 hours prior to the start of site disturbance, a qualified biologist will conduct focused ocular surveys for western pond turtles to determine the presence or absence of this species on the Project site. 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 will be conducted under the direct supervision of the qualified biologist. If juvenile or adult turtles are found aestivating or hibernating on the Project site, the individuals will be moved out of the construction area and relocated as near as possible in suitable habitat outside the area of construction. 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.

(b) A letter report documenting survey methods and findings will be submitted to DFG following the completion of the preconstruction survey.

(c) Before land-based construction, a worker environmental training awareness program will be conducted by a qualified biologist. The training will 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 will cease within 50 feet of the area until the animal can be moved to a safe location.

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 Burrowing Owl Survey Protocol and Mitigation Guidelines (1997) 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 (California Burrowing Owl Consortium 1997) will 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 will 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) should be surveyed for occupancy by burrowing owls within 30 days of initial ground disturbance. The California Burrowing Owl Survey Protocol (CBOC 1997) 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 will be prepared by a qualified biologist and submitted to DFG and Project sponsor for approval. The Plan will describe passive relocation procedures and maintenance of one-way doors during site disturbance, and habitat restoration after the

Project is completed. Passive relocation procedures will include the installation of one-way doors in burrow entrances by a qualified biologist. One-way doors should 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 DFG Staff Report on Burrowing Owl Mitigation Guidelines (1995) will 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 will be provided.

(e) Before land-based site disturbance, a worker environmental training awareness program will be conducted by a qualified biologist. The training will 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 will cease within 160 feet of the area until the animal can be moved to a safe location consistent with DFG regulations.

A monitoring report of all activities associated with surveys and mitigation for this species will be submitted to DFG and Project sponsor within one month after construction is completed. If owls are observed in the study area, monitoring reports will be submitted to DFG and the Project sponsor before any action is taken. CNDDB reports will be submitted within one month of each observation with a copy to the local DFG biologist and the Project sponsor.

4.5.4.4 Swainson's Hawk, Black Rail, and Other Raptors and Migratory Nesting Birds

Less than Significant with Mitigation Incorporated. Swainson's hawk has been observed foraging on site and could nest in trees on Holland Tract and Bacon Island at Old River that are located within 250 feet of the Project activities. Black rail is documented to occur in the dense emergent wetland habitat on the islands in Old River and Connection Slough. Nesting and foraging habitat for this species is present in the Project area, particularly 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.

Raptors and migratory birds have been documented in the Project vicinity. Suitable nesting habitat for various raptors and other migratory birds is present in the large trees on 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 tricolored blackbird, loggerhead shrike, and other birds protected by the MBTA.

Installation of the Project facilities would not affect nesting activities of Swainson's hawk because construction would 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) in 2014 would 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. Therefore, the project would not adversely affect the nesting behavior of Swainson's hawk.

Construction activities would not affect the nesting activities of black rail, tricolored blackbird, or loggerhead shrike because land-based construction activities would occur September through November, outside the nesting season. Removal of the gates and boat ramps between July and November 2014 would occur towards the end of or after the nesting season. Removal activities in 2014 could adversely affect the nesting behavior of these 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-4, the Project Proponent would reduce the potential for construction-related impacts on nesting birds to a less-than-significant level.

Mitigation Measure BIO-4: Conduct Preconstruction Surveys for Nesting Birds Prior to Construction Activities and 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 will 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 will be fenced with orange construction fencing or equivalent, and the buffer will 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 will be determined by a qualified wildlife biologist, and will 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 will be repeated.

4.5.4.5 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 (*Potamogeton zosteriformis*) 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. Two rare plants were observed within the study area: woolly rose-mallow, and Suisun Marsh aster. The remaining plant that has a moderate or higher potential to occur, brown fox sedge, is spring-blooming, and may be present.

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-5, The Project Proponent would reduce the potential for construction-related impacts on special-status plants to a less-than-significant level.

Mitigation Measure BIO-5: 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) will be conducted to determine if any special-status plant species are present within the study area. A summer survey has already been conducted on the Project area on Holland Tract and Bacon Island.

(b) If rare plants are present within the development area of the Project, the feasibility of avoidance will be evaluated. Avoidance would include the installation of orange construction fencing around the plants prior to site disturbance. The summer-blooming rare plants observed within the study area would be afforded protection by this measure.

(c) If a survey timed to coincide with the flowering period for brown fox sedge cannot be performed due to a lack of access to the site, it will be assumed to be present. Prior to construction, a thorough search for plants sharing the vegetative characteristics of brown fox sedge will be made and if present, assumed to be the sensitive species. Individual plants found will be subject to the measures described in (d), below.

(d) If avoidance is not feasible, a mitigation plan, approved by DFG, will be developed and implemented, using the following steps: (1) number and area of rare plants affected by the Project will be measured and documented; (2) affected plant(s) will be transplanted to a suitable nearby area; (3) a conservation easement of occupied habitat for the affected plant species in an area nearby the Project site potentially will be established; and/or (4) a mitigation population near the Project site potentially will be established (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).

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 construction-level measures will be employed to ensure that riparian habitat and sensitive wetland communities near the project site will be protected during construction through the installation of protective fencing. IF THE IMPACT IS TRULY SIGNIFICANT, AND FENCING IS THE MITIGATION, THEN IT NEEDS TO BE IDENTIFIED AS A MITIGATION—THERE IS FENCING CALLED FOR IN BIO-6—MAYBE THE SAME MEASURE CAN APPLY HERE AND BELOW?. The project will not have a substantial adverse impact on any riparian habitat or other sensitive natural community.

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-6, 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-6: Mitigation for the discharge of fill to wetland habitats will meet the requirements established by the Corps, RWQCB, and DFG and may include 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. Additionally, orange construction fencing will be installed around the perimeter of wetlands and other waters in proximity to construction activities to prevent accidental disturbance during construction.

The Project Proponent also will 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 the above permit/certification/agreement. THERE IS PROBABLY A BETTER WAY OF WORDING THIS.

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. All terrestrial special-status species with potential to occur in the Project area are highly mobile and would be able to move around the gates.

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 or San Joaquin County General Plans 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 boundaries exclude the 2-Gates Project area. The SJMSCP 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.

4.5.4.6 Cumulative Impacts

The Project is not likely to result in cumulative impacts to terrestrial special-status species or wetlands. The effects of the Project are individually and cumulatively limited in scope, scale and duration, and the proposed mitigation measures would fully offset the effects of the Project on terrestrial species and wetlands.