3.5 BIOLOGICAL RESOURCES

This section summarizes biological resources known to occur, or with the potential to occur, in Buena Vista Lagoon and areas identified for materials disposal/reuse; assesses potential impacts as a result of project implementation; and provides recommended avoidance, minimization, and mitigation measures.

The laws, ordinances, regulations, and guidance applicable to this section are summarized in Appendix B. The following is a list of those that pertain to biological resources addressed within this document:

- Clean Water Act (Section 404 Discharge of Dredge or Fill Material)
- Endangered Species Act
- Executive Order 11990 – Protection of Wetlands
- Executive Order 13112 – Invasive Species
- Magnuson-Stevens Fishery Management and Conservation Act, as amended 1996 (Public Law 104-267)
- Marine Protection, Research, and Sanctuaries Act
- Migratory Bird Treaty Act
- California Endangered Species Act
- California Environmental Quality Act
- California Fish and Game Code (Section 1602 Streambed Alteration, Section 3503 and 3503.5, Protection of Birds, Nests, and Raptors, and Fully Protected Species)
- California Native Plant Protection Act
- Natural Community Conservation Plans and Habitat Conservation Plans
- Porter-Cologne Water Quality Control Act

Information in this section is derived from three key sources: the Biological Technical Report (BTR) focusing on the lagoon (Appendix E) and a Marine Resources Technical Report addressing disposal and nearshore marine resources (Appendix F). Substantial data have been collected by a wide variety of technical specialists regarding biological resources in the lagoon over the past few decades, including monthly bird counts, sensitive species surveys, invertebrate and fish surveys, and vegetation surveys. Data collected by these specialists through the year 2013 have been incorporated into the document, as described in Appendix E, Table 2-1. Project-specific surveys have been conducted for some resources, while the most current available data for other resources have been used to avoid duplication of survey efforts in Buena Vista Lagoon. This information is incorporated into the BTR, as well as this section.

This evaluation references findings from previously conducted surveys, plus surveys and research by AECOM and Merkel & Associates biologists. The LA-5 disposal site is an existing EPA-approved offshore marine disposal site and materials would be placed consistent with mandated conditions for use, as described in Chapter 2. Thus, the biological conditions associated with this offshore location and impacts associated with disposing of materials into this site have been evaluated separately as part of that approval process and are not included in this analysis. Preliminary coordination with the Corps and EPA has indicated that the materials appear suitable for disposal at LA-5. If LA-5 is selected for materials disposal, additional testing (e.g., Tier 3 testing) would be completed to confirm material is suitable for disposal as part of the final Section 404 permitting authorization.

3.5.1 EXISTING CONDITIONS

This section provides separate descriptions of both study areas: the lagoon and the various materials disposal/reuse sites (nearshore and offshore). The lagoon study area is referred to as the Biological Study Area (BSA) throughout this section and includes the approximately 220-acre Buena Vista Lagoon with a surrounding 500-foot buffer. The materials disposal/reuse study area discussion addresses beach, and nearshore and offshore areas that may be affected by materials disposal.

Buena Vista Lagoon Biological Study Area

The lagoon is bisected by I-5. The western extent of the BSA includes a small portion of beach where it is bordered by the coast. The southern extent of the BSA is bordered by Carlsbad residences west of I-5 and by Jefferson Street east of I-5. The northern boundary is bordered by Oceanside residential development west of I-5 and by SR 78 east of I-5. The eastern boundary of the BSA occurs along Jefferson Street.

The North County Multi Habitat Conservation Program (MHCP), one of the regional conservation planning documents that covers this portion of northern San Diego County, covers the entire BSA (SANDAG 2003). The northern half of the BSA occurs within the City of Oceanside; the Oceanside subarea plan will be the MHCP implementing document of the northern portion, once approved (Foothill and Associates 2010). The southern half of the BSA occurs within the City of Carlsbad; the City of Carlsbad Subarea Plan (City of Carlsbad 2004) is the MHCP implementing document for the southern portion. Portions of the BSA are within conservation areas referred to as Hardline Focused Planning Areas within both subarea plans (Figure 3.5-1).

Source: SANDAG 2012; Sangis; Everest; AECOM 2014

1,000 500 0 1,000 Feet

Scale: 1 = 12,000; 1 inch = 1,000 feet

Figure 3.5-1
Regional Conservation Planning within the Biological Survey Area (BSA)

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Vegetation Communities

Vegetation communities are assemblages of plant species that usually coexist in the same area and provide habitat for wildlife species. The classifications are based on the life form of the dominant species within that community and the associated flora. Field surveys were performed by AECOM in the spring of 2013. Descriptions of these vegetation communities and other cover types are provided in the following discussion. Three generalized categories are used to characterize and discuss the land cover types observed during vegetation community mapping: riparian and other wetlands, uplands, and other cover types. Within these three categories, six riparian and wetland communities, five upland communities, and two cover types were delineated during the spring 2013 field surveys (Figure 3.5-2). The acreages of each vegetation community and cover type within the BSA are provided in Table 3.5-1.

Table 3.5-1
Vegetation Communities and Other Cover Types within the BSA (Acres)

Vegetation Communities and Other Cover Types[1]	Project Footprint	500-foot Buffer	BSA
Riparian and Wetlands	**229.0**	**20.4**	**249.4**
Beach/ocean	0.0	13.0	13.0
Coastal and valley freshwater marsh	97.3	3.5	100.8
Nonnative riparian	6.6	3.2	9.7
Open water	106.7	0.3	107.0
Southern coastal salt marsh nontidal	14.5	0.3	14.8
Southern willow scrub	4.1	0.0	4.1
Uplands	**7.2**	**21.5**	**28.7**
Coastal scrub	0.6	0.3	0.9
Diegan coastal sage scrub	0.0	3.5	3.6
Diegan coastal sage scrub: *Baccharis*-dominated	0.7	1.0	1.7
Eucalyptus woodland	4.0	12.2	16.2
Nonnative grassland	1.9	4.5	6.4
Other Cover Types	**19.6**	**260.2**	**279.8**
Disturbed habitat	0.4	8.3	8.6
Urban/developed	19.3	251.9	271.2
Total	**255.8**	**302.1**	**557.9**

Designated Habitats

In addition to sensitive habitats, certain habitats receive special designation by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). Below is a discussion of specially designated habitats within the survey areas.

USFWS Critical Habitat

USFWS designates critical habitat for federally threatened and endangered species. It is a specific geographic area(s) that is essential for the conservation of a threatened or endangered

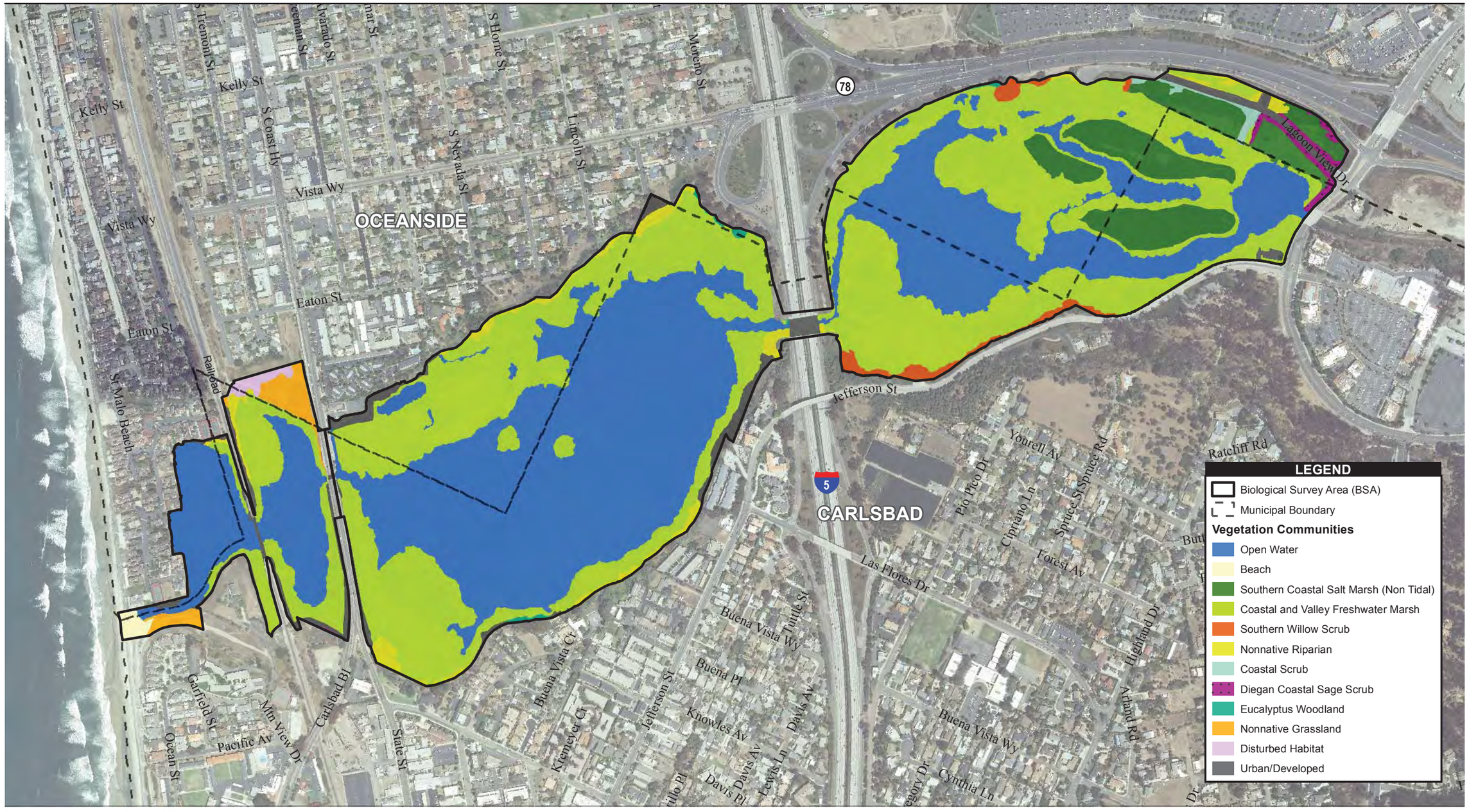
species and that may require special management and protection. An area is designated as "critical habitat" after USFWS publishes final boundaries of the critical habitat area in the *Federal Register*.

No designated critical habitat for federally listed species is mapped within the BSA. The nearest occurrence of critical habitat belongs to the coastal California gnatcatcher, approximately 1 mile east of the lagoon, within an undeveloped canyon of coastal sage scrub habitat bounded by residential development and I-5. It is not anticipated that any critical habitat belonging to federally listed species would be impacted by this project; therefore, impacts to designated critical habitat are not addressed further in this EIR.

Essential Fish Habitat and Fish Resources

As described in the Regulatory Section in Appendix B, Essential Fish Habitat (EFH) is defined as those "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The coastal waters of southern California are designated as EFH and are managed by NMFS. No designated EFH occurs within Buena Vista Lagoon, as the lagoon currently is closed off to tidal influence from the ocean and does not provide habitat for spawning, breeding, or feedback for ocean fish species.

The fish found within the BSA consist of at least 12 species (according to studies in 1999 and 2003, which is the most recent data available), with only two native fish species and the rest nonnative species. The fish species detected within the BSA include the native California killifish (*Fundulus parvipinnis*) and striped mullet (*Mugil cephalus*). Both native species are euryhalic and can be found in a variety of marine, estuarine, and freshwater habitats (Moyle 2002). The remaining nonnative species are black bullhead (*Ameiurus melas*), brown bullhead (*Ameiurus nebulosus*), bluegill (*Lepomis macrochirus*), carp (*Cyprinus carpio*), mosquito fish (*Gambusia affinis*), golden shiner (*Notemigonus crysoleucas*), goldfish (*arassius auratus auratus*), green sunfish (*Lepomis cyanellus*), smallmouth bass (*Micropterus dolomieu*), and largemouth bass (*Micropterus salmoides*). The introduction of nonnative fish species can have negative impacts on native fish species through competition and predation. This may account for the very low numbers of striped mullet and California killifish detected during the 2003 fish assemblage surveys at Buena Vista Lagoon. No special-status fish species were detected within the BSA during those surveys, and it is highly unlikely that special-status fish species have been introduced to the lagoon since that time. Poor water quality, such as conditions in Buena Vista Lagoon, is a major contributor to declines and extirpation of listed species when they are present in a system. An assessment of the potential for listed species to occur in the lagoon concluded occupation was highly unlikely due to lack of suitable habitat, water quality, and the lack of presence prior to 2003.



Source: SANDAG 2012; Sangis; Everest; AECOM 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-2
Vegetation Communities within the Biological Survey Area (BSA)

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Jurisdictional Waters and Wetlands

A reconnaissance-level jurisdictional assessment was completed for the BSA in 2013. A total of 224.2 acres of potential jurisdictional waters and wetlands occurs within the BSA. Of these acres, 219.7 acres is considered potential waters of the U.S. and state under the jurisdictional purview of the Corps, RWQCB, CCC, and CDFW. An additional 4.5 acres of nonwetland riparian habitat is considered potential nonwetland riparian habitat subject to the regulatory purview of CDFW.

Vegetation is classified by habitat type using the Holland Code Classification System (Holland 1986) as modified by Oberbauer (Oberbauer et al. 2008) and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) to describe riparian and wetland (e.g., hydrophytic) vegetation communities occurring within the BSA. A summary of the jurisdictional waters of the U.S. and CDFW with the corresponding regulatory authority, occurring within the BSA, is provided in Table 3.5-2 and Figure 3.5-3.

Table 3.5-2
Potential Waters of the U.S. and State Occurring within the BSA

Type of Jurisdictional Waters of the U.S. and State	Type of Habitat (Holland et al. 1986, Oberbauer et al. 2008)	Type of Habitat (Cowardin et al. 1979)	Area of Aquatic Resource (acres)
Jurisdictional Waters of the U.S. (Corps, RWQCB, CDFW, and CCC)			
Wetland	Southern coastal salt marsh (52120)	Estuarine; nontidal; Emergent, Persistent, Seasonally Flooded, Mixohaline	14.8
Wetland	Coastal and valley freshwater marsh (52410)	Palustrine; Emergent, Persistent, Permanently Flooded, Fresh	95.9
Wetland	Southern willow scrub (63320)	Palustrine; Scrub/Shrub Broad-leaved, Deciduous, Seasonally Flooded, Fresh	2.2
Other Waters	Open water (64100)	Estuarine; Unconsolidated Bottom, Mud, Fresh	106.8
Subtotal Jurisdictional Waters of the U.S.			*219.7*
Jurisdictional Waters of the State (exclusively CDFW)			
Nonwetland Riparian	Nonnative riparian (65000)	Palustrine; Forested Broad-leaved, Deciduous, Seasonally Flooded, Fresh	4.1
Nonwetland Riparian	Eucalyptus woodland (79100)	Palustrine; Forested Broad-leaved, Evergreen	0.4
Subtotal Jurisdictional Waters of the State (CDFW)			*4.5*
Grand Total Jurisdictional Waters			**224.2**

Rare, Threatened, or Endangered Species

This section summarizes the sensitive flora (plants) and fauna (animals) known to occur, or with the potential to occur, within the BSA.

Flora

The BSA is biologically diverse with approximately 123 species of plants. As described in the BTR (Appendix E), 10 sensitive plant species were determined to have some potential to occur in the BSA based on habitat conditions and regional location. Of these, one species, southwestern spiny rush (*Juncus acutus* ssp. *leopoldi*), was detected within the BSA during the 2013 botanical survey. ~~This~~ Observations of this plant species from the 2013 survey are~~is~~ mapped in Figure 3.5-4 and identified below.

SOUTHWESTERN SPINY RUSH

Southwestern spiny rush is not federally listed but is considered sensitive by the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (CNPS 2013) in List 4. This species ranges from southern California south to Baja California, Mexico. Coastal salt marsh, brackish marsh, and alkaline meadows are all suitable habitat for this species (Reiser 2001). Southwestern spiny rush occurs in the eastern portion of the BSA in southern coastal salt marsh and coastal and valley freshwater marsh habitats. Southwestern spiny rush individuals were previously recorded south of the Buena Vista Audubon Nature Center on the east site of South Coast Highway 101 (personal communication Melissa Tu, 2015).

Federally and State Listed Plant Species

Of the 10 sensitive plant species determined to have potential to occur in the BSA, two are listed as federally endangered: San Diego ambrosia (*Ambrosia pumila*) and coastal dunes milk-vetch (*Astragalus tener* var. *titi*). Coastal dunes milk-vetch is also state listed as endangered. These two species were not detected within the BSA during surveys and are therefore not discussed further in this document.

Fauna

The BSA is biologically rich with 17 aquatic invertebrates, 12 species of fish, over 15 reptile and amphibian species, over 236 avian species, and 18 mammal species. As discussed in the BTR, 114 special-status wildlife species have potential to occur within the BSA (CDFW 2013; Coastal

OCEANSIDE
CARLSBAD
78
5
Kelly St
S Tremont St
S Coast Hy
Alvarado St
S Horne St
Moreno St
S Nevada St
Lincoln St
Vista Wy
Railroad
Eaton St
St Malo Beach
Lagoon View Dr
Jefferson St
Yourell Av
Pio Pico Dr
Cipriano Ln
Spruce St
Ratcliff Rd
Guevara Rd
Butters Rd
Lorna Ln
Forest Av
Las Flores Dr
Buena Vista Wy
Tuttle St
Buena Vista Cr
Buena Pl
Jefferson St
Knowles Av
Davis Av
Lewis Ln
Davis Pl
Kremeyer Ct
Cynthia Ln
Garfield St
Ocean St
Pacific Av
Mtn View Dr
Carlsbad Bl
State St

LEGEND

- Biological Survey Area (BSA)
- Municipal Boundary

Potential Jurisdictional Waters

Waters of the State (CDFW Only)

- Nonwetland Riparian

Waters of the U.S. and State (USACE, RWQCB, CDFW, CCC)

- Wetland
- Other Waters

Source: Sangis 2014; SANDAG 2012; AECOM 2014; Everest 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-3
Jurisdictional Resources within the Biological Survey Area (BSA)

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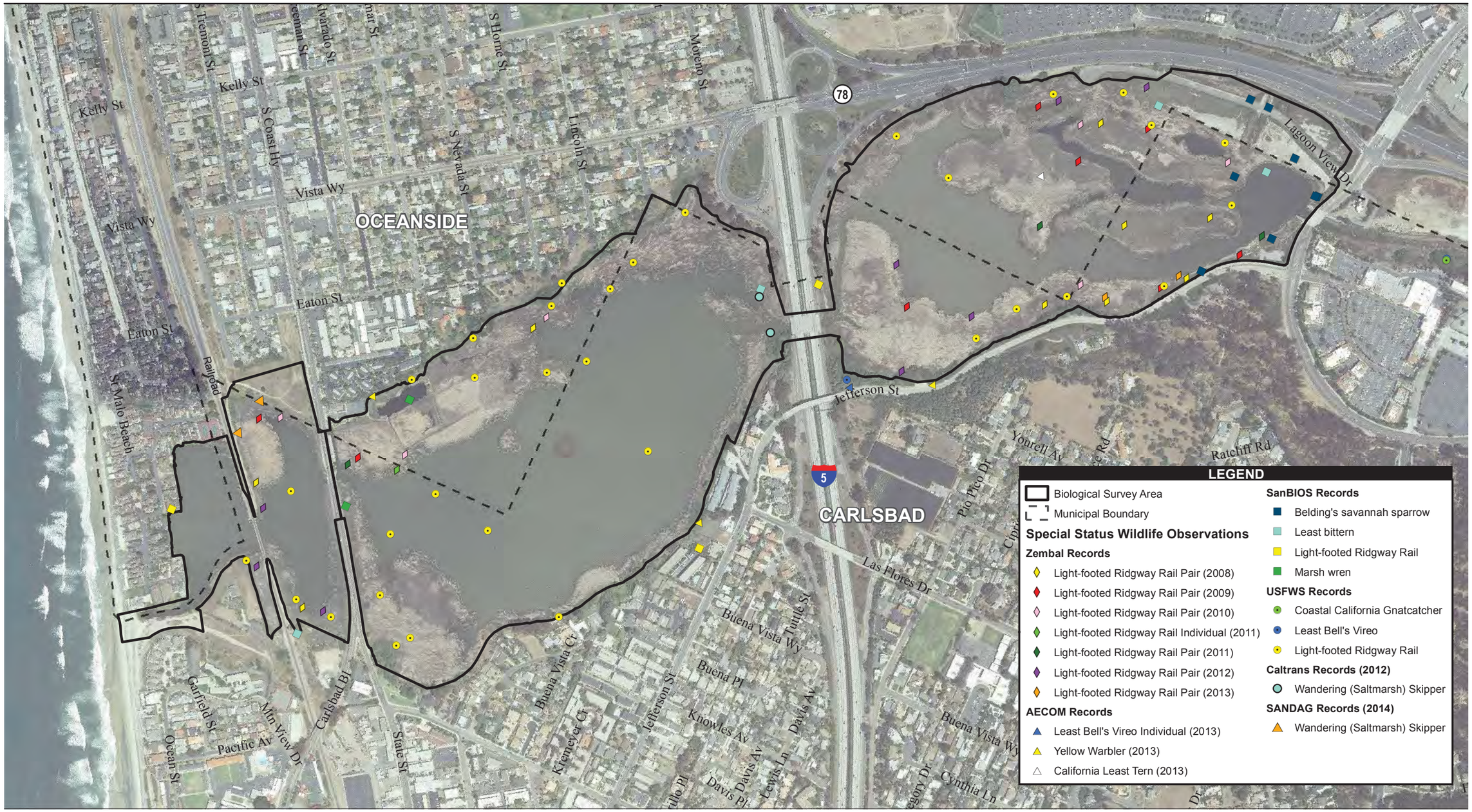
Source: SANDAG 2012; SANGIS; AECOM 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-4
Special-Status Plants

Path: P:\2013\60288954_BVLEP_EIR\06GIS\6.3_Layout\Reports\EIR\SSP.mxd, 12/22/2014, steinb



Source: SANDAG 2012; SANGIS; AECOM 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-5
Special-Status Wildlife

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Environments 2000). Of these 114 special-status wildlife species, seven federally listed and/or state-listed species and 22 rare nonlisted species were detected during studies and are considered resident/breeding within the BSA. Location data available for special-status wildlife species detected in the BSA are shown in Figure 3.5-5. Detailed discussions of federally listed and state-listed special-status wildlife species detected during studies that are considered resident/breeding within the BSA are provided below. Nonlisted special-status species with potential to occur, but considered migrants/nonbreeding season residents (no suitable breeding habitat is present on-site), are discussed only in the BTR (Appendix E).

Federally and State Listed Species

Of the 114 special-status wildlife species with potential to occur within the BSA, seven species are listed as federally and/or state threatened or endangered and are known to occur historically within or adjacent to the BSA (and are not shown in figures within this document) or were detected on-site during previous studies:

- light-footed Ridgway's rail,
- western snowy plover,
- California least tern,
- southwestern willow flycatcher,
- least Bell's vireo
- coastal California gnatcatcher; and,
- Belding's savannah sparrow.

These species are discussed in further detail below.

LIGHT-FOOTED RIDGWAY'S RAIL

The light-footed Ridgway's rail is federally and state listed as endangered. Light-footed Ridgway's rails are uncommon, localized residents. The food supply for Ridgway's rail includes insects, spiders, arthropods, small fish, and vegetable matter; these birds are omnivorous and opportunistic (USFWS 1985a). Breeding habitat for this species is restricted to coastal salt marshes in southern California where vegetation is dominated by cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia* sp.). It can also be found in brackish and freshwater marshes with cattails and bulrushes. In fresh/brackish water, Ridgway's rails build nests in dense cattail or bulrush. Ridgway's rail is a reclusive species and will nest and utilize relatively small patches of its preferred habitat when isolated from external anthropogenic disturbances (Zembal et al. 2010).

Suitable habitat within the BSA occurs where cattails and pickleweed are found throughout all basins within the BSA. Within the BSA, the light-footed Ridgway's rail is a year-round resident at Buena Vista Lagoon and can be heard calling at times, although it is rarely seen. Within the past 5 years, the total number of breeding pairs in the lagoon has ranged from a high count of nine, dwindling to only two pairs in 2013, and four pairs in 2014 (Zembal et al. 2013; Zembal et al. 2014). As of 2012, when nine breeding pairs were present, five pairs were found in the I-5 Basin and four pairs were found in the Coast Highway and Railroad Basins. Only one male was found in the Coast Highway Basin near the Interpretive Center. Surveys were conducted in appropriate breeding habitat. Rails were detected mostly by listening for the call of the rail. Tape playback of various Ridgway's rail calls was also used to elicit responses. Locations of light-footed Ridgway's rail observations within the BSA from the past 5 years are depicted in Figure 3.5-5.

WESTERN SNOWY PLOVER

The western snowy plover is listed as federally threatened and a species of special concern by the state. Western snowy plover occurs along the Pacific coast from southern Washington to Baja California. It is a common winter migrant, winter visitor, and a declining and local resident in San Diego County. It nests on undisturbed, flat areas with loose substrate, such as sandy beaches and dried mudflats along the California coast. Western snowy plovers forage primarily on the wet sand at the marine beach-surf interface, where they feed on small crustaceans, marine worms, insects, and amphipods. They have also been observed gleaning insects while in flight (USFWS 2007). Lagoons with some salinity have been shown to provide the best foraging habitat.

Presently, suitable habitat within the BSA occurs mainly at the beach at the west end of the BSA; however, if water levels were to drop and expose mudflats, suitable foraging habitat would be available for this habitat type, which may occur at the fringes of the open water within each basin. Within the BSA, snowy plovers are rarely observed foraging on the beach during the winter season. Historically, plovers were recorded nesting within the BSA; however, several historical nesting sites (including Buena Vista Lagoon) have been altered so much by development, erosion, and human use that breeding habitat no longer exists for snowy plovers (Western Birds 1981).

CALIFORNIA LEAST TERN

The California least tern is state and federally listed as an endangered species. The species breeds from San Francisco Bay south to Baja California. In San Diego County, it is a fairly common

summer resident from early April to the end of September (Unitt 2004). Significant nesting sites in San Diego County include Mission Bay, Aliso Creek, Batiquitos Lagoon, Tijuana River mouth, Chula Vista, North Island Naval Air Station, San Elijo Lagoon, and Lindbergh Field. Wintering areas are thought to be along the Pacific coast of South America. The species historically nested colonially on beaches that are undisturbed, sparsely vegetated, flat areas with loose, sandy substrate. Few beach nesting areas remain and least terns are now found in varied habitats ranging from mudflats to open areas at Lindbergh International Airport. Adults roost primarily on the ground. They typically forage in areas with water less than 60 feet in depth (Atwood and Minsky 1983). In San Diego County, this species has been documented feeding on deepbody and slough anchovies (*Ancho* asp.), shiner surfperch (*Cymatogaster aggregata*), longjaw mudsucker (*Gillichthys mirabilis*), California killifish, jacksmelt (*Atherinopsis californiensis*), and mosquitofish (*Gambusia affinis*) (USFWS 1985a). This small migratory tern begins nesting in mid-May and is present at nesting colonies from April through August. The species nests in loose colonies in areas relatively free of human or predatory disturbance. Nests are on barren to sparsely vegetated sites near water, usually with a sandy or gravelly substrate.

Suitable habitat within the BSA occurs mainly at the beach at the west end of the BSA; however, this species regularly forages throughout the open water of all basins within the BSA. Within the BSA, the least tern is a common migrant and is observed foraging during the appropriate time of year. Records indicate that this species historically had a breeding population within the BSA; the last records of breeding within the BSA are from 1992. Therefore, it is highly unlikely this species would be found nesting in the BSA. It appears that large roosting flocks of gulls, pelicans, etc., along with the many perches and trees on the periphery of the BSA for raptors to hunt from, discourage breeding attempts in the area. One least tern was incidentally detected foraging within the BSA during 2013 surveys (Figure 3.5-5).

SOUTHWESTERN WILLOW FLYCATCHER

The southwestern willow flycatcher, a subspecies of willow flycatcher (*Empidonax trailli*), is federally and state listed as endangered (USFWS 1995). The southwestern willow flycatcher was federally listed as endangered in 1995 and state listed as endangered in 1990. The southwestern willow flycatcher is a summer breeding resident in riparian habitats in southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and northwestern Mexico (USFWS 1995). This species is known to forage on small to medium-sized insects (USFWS 2002). In San Diego County, only two large, consistent breeding populations are known to remain along the Santa Margarita River and the upper San Luis Rey River. The southwestern willow flycatcher is restricted to dense riparian woodlands of willow, cottonwood, and other deciduous shrubs and trees. In general, the riparian habitat of this species

tends to be rare, isolated, small, and/or in linear patches, separated by vast expanses of arid lands.

Focused protocol surveys for this species were conducted in 2013 and none were detected (AECOM 2013). Surveys were conducted based on the presence of marginal foraging habitat. Within the BSA, breeding habitat for this species does not occur. There is a California Natural Diversity Data Base (CNDDB) record of this species found approximately 1 mile west of the BSA (not shown in figures within this document). It is unclear whether this record is accurate, or if it was a migrating willow flycatcher of unknown subspecies.

LEAST BELL'S VIREO

The least Bell's vireo is federally and state listed as endangered. Least Bell's vireo breeding season extends from March through September. During the breeding season, the least Bell's vireo is restricted to riparian woodland and riparian scrub. In San Diego County, it occurs mainly in the coastal lowlands, rarely up to 3,000 feet elevation. Territory size ranges from 0.5 to 7.5 acres and there is evidence of high site fidelity among adults (Kus 2002). Early to mid-successional riparian habitat is typically used for nesting by this vireo because it supports the dense shrub cover required for nest concealment as well as a structurally diverse canopy for foraging (Kus 2002). Food supply for this species consists of insects, including bugs, beetles, grasshoppers, moths, and caterpillars (USFWS 1998).

Within the BSA, this species has been recorded within southern willow scrub habitat. Observations of this species within willow scrub were on the south side of the BSA in the I-5 Basin during focused surveys for the species (AECOM 2013). However, this species was detected during a single survey, and presumably was a migrant using the BSA as stop-over habitat since a vireo was not seen after the first detection and it did not establish a nest (Figure 3.5-5).

COASTAL CALIFORNIA GNATCATCHER

The coastal California gnatcatcher is listed as federally threatened and is a state species of special concern. Federally designated critical habitat exists for the species. Habitat preferences in San Diego County consist of Diegan coastal sage scrub dominated by California sagebrush and flat-topped buckwheat, which are the primary plants used by coastal California gnatcatchers when foraging for insects (ERCE 1990). The California gnatcatcher is a resident bird species and inhabits coastal sage scrub vegetation below 2,500 feet elevation in Riverside County and generally below 1,000 feet elevation along the coastal slope in San Diego County; it generally avoids steep slopes above 25 percent and dense, tall vegetation for nesting.

Within the BSA, the coastal California gnatcatcher has historically been known to occur within the coastal sage scrub located at the east end of the BSA. However, the minimal amount of suitable habitat within the BSA and very infrequent detections of this species likely indicate dispersing individuals from other nearby breeding locations outside the BSA. From available sources, the last coastal California gnatcatcher detection was in 1997 (eBird 2014).

BELDING'S SAVANNAH SPARROW

Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) is a state-listed endangered species. Belding's savannah sparrow is a resident from Santa Barbara County to northern Baja California. In San Diego County, populations are known from the Tijuana estuary, San Diego Bay, Mission Bay, San Dieguito Lagoon, Peñasquitos Lagoon, San Elijo Lagoon, Batiquitos Lagoon, Agua Hedionda Lagoon, Santa Margarita River mouth, and Aliso Creek mouth (Unitt 2004). Its preferred habitat is the edge of pickleweed-dominated coastal salt marsh associations. Breeding occurs mostly in dense, moist grasslands, wet meadows, and salicornia wetlands, with or without scattered shrubs or clumps of tall herbs. The preferred food source for this species is brine flies (Zembal and Hoffman 2010). In winter, the species occupies moist and dry grasslands but prefers dense, short ground cover. It also occurs in low vegetation in croplands and along beaches and shorelines. The primary threat to the species is the massive loss of coastal salt marsh habitat that has occurred in recent years.

Suitable habitat within the BSA occurs where pickleweed is found, particularly in the I-5 Basin at the northeastern portion of the BSA. This species may forage at the beach at the west end of the BSA. Within the BSA, the Belding's savannah sparrow is not a common resident within the pickleweed marsh. Surveys have been conducted within the lagoon from 1973 through 2010. Since 1986, the BSA has been surveyed every 5 years as part of a statewide survey effort for the species. During the 2010 survey, no Belding's savannah sparrow territories were detected. According to Zembal et al., the freshwater marsh and song sparrows (*Melospiza melodia*) have encroached into pickleweed bands enough to preclude Belding's savannah sparrow (Zembal et al. 2010). From available sources, the last Belding's savannah sparrow detection was actually in 2010 (eBird 2014). With conflicting data in 2010, it is possible this species was detected during surveys but was not showing territorial behaviors due to degrading and unsuitable habitat, and was present in extremely low numbers. According to monthly bird counts, savannah sparrows were detected in 2009 and 2011 but were not identified as Belding's savannah sparrow. In 2009, the observation was in May, and in 2011 was in November; both are months when other migratory (nonresident) subspecies of savannah sparrow are present within San Diego County. Based on survey data, it is highly unlikely this species would be found nesting in the BSA.

Nonlisted Special-Status Wildlife Species

In addition to the federally listed and state-listed species discussed above, 22 nonlisted special-status wildlife species were detected during previous studies and are considered resident/breeding within the BSA. These are wandering (salt marsh) skipper *(Panoquina panoquin*), western spadefoot toad (*Spea hammondii*), ~~south~~western pond turtle (~~*Actinemys marmorata pallid*~~*Emys marmorata marmorata*), San Diego coast horned lizard (*Phrynosoma coronatum* (*blainvillei*), two-striped garter snake (*Thamnophis hammondii*), redhead (*Aythya americana*), least bittern (*Ixobrychus exilis*), white-faced ibis (*Plegadis chihi*), white-tailed kite (*Elanus leucurus*), Cooper's hawk (*Accipiter cooperi*), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), Allen's hummingbird (*Selasphorus sasin*), Nuttall's woodpecker (*Picoides nuttallii*), western bluebird (*Sialia Mexicana*), Clark's marsh wren (*Cistothorus palustris clarkae*), yellow warbler (*Dendroica petechia brewsteri*), yellow-breasted chat (*Icteria virens*), western red bat (*Lasiurus blossevillii*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), southern grasshopper mouse (*Onychomys torridus Ramona*), and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*).

As listed above, the western red bat is a CDFW species of special concern that has the potential to occur within the BSA. While not specifically observed during biological surveys, CDFW staff have observed bats roosting in the I-5 bridge (CDFW 2015).

The western pond turtle was last observed during pre-1988 surveys with no evidence of sightings since that time (CDFW 2015).

Nonlisted special-status species with potential to occur in the BSA, but not detected during historical surveys, and those nonlisted special-status species detected in the BSA, but where the BSA does not contain suitable breeding habitat are described in Appendix E and are not addressed further in this EIR.

Wildlife Corridors/Connectivity

Connectivity, or the ability of organisms to move through a landscape, is essential in heterogeneous landscapes, especially in increasingly urban settings, for the persistence of healthy and genetically diverse animal communities. Corridors can facilitate connectivity on different temporary and spatial scales. Corridors are linear landscape features that allow for species movement over time between two patches of habitat or patches of vital resources that would otherwise be disconnected (Beier and Noss 1998; Lidicker and Peterson 1999; Beier et al. 2008). Because many wildlife species have species-specific habitat requirements for survival and dispersal, corridors may also be species specific. At a minimum, corridors promote local

colonization or recolonization of distinct habitat patches and potentially increase genetic variability within and between populations. Isolation of populations can have harmful impacts on both population genetics and metapopulation dynamics. In addition, increased exposure to an inhospitable urban matrix due to reductions in connectivity can increase general mortality. All of these factors can contribute significantly to local species extinctions. Thus, corridors help species populations, distributed in and among habitat patches, to persist over time.

Local corridors allow resident animals to access critical resources (food, water, and cover) in other areas that might otherwise be isolated. The area is important to local wildlife movement as it provides open, undeveloped habitats for wildlife use. In general, wildlife species are likely to use habitat in the BSA for movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover).

Regional corridors link two or more large areas of natural open space. Buena Vista Lagoon has been identified as a Biological Core and Linkage Area (BCLA) under the MHCP, and it is completely surrounded by development. Instead of functioning as a regional corridor, Buena Vista Lagoon is a large area of natural open space important because it provides habitat for core populations of sensitive wildlife and plant species. This BCLA functions as a large contiguous area of habitat that supports major and critical species populations such as those species discussed in this document, and is considered an area of high habitat value (SANDAG 2003).

Materials Disposal/Reuse Study Area

The proposed project and its alternatives would generate material for disposal, possibly through export to offshore disposal or stockpiling sites, reuse for construction of infrastructure, or reuse for beach/nearshore nourishment.

The biological conditions of the Oceanside and Carlsbad onshore placement sites, as well as the Oceanside nearshore placement site, were analyzed as receiver sites in the Marine Resources Technical Report (Appendix F) prepared by Merkel & Associates (2014) and are summarized below. Each of the placement sites is described in terms of habitat and species identified within its boundaries (i.e., footprint) as well as nearby sensitive resources. An overview of the placement sites and nearby sensitive resources is shown in Figure 3.5-6. Sensitive resources are defined at the habitat level to include vegetated nearshore reefs and kelp beds, and at the species level to include threatened or endangered species. Potential suitability of placement sites as spawning habitat for California grunion is noted in the text.

Source: SANDAG 2011

Figure 3.5-6
Nearshore Resources and Proposed Receiver Sites within the Study Area

Littoral Zone Nourishment

Beach

Below is a description of the beach habitat located at each onshore placement site.

OCEANSIDE

The Oceanside placement site contains beach habitat that is predominantly sand. Sand depths measured in November 2008 ranged from 15 to greater than 48 inches and averaged more than 2 feet across tide zones. Cobbles occur throughout the tide zone, ranging from sparse to common in the mid-tide zone, but are sparse in high and low tide zones. Kelp and surfgrass wrack is sparse and localized on the beach. Riprap shore protection occurs along the back beach of the site; the wetted sand line indicates wave run-up to the riprap zone. No surfgrass was observed on hard substrates.

CARLSBAD

The Carlsbad placement site contains beach habitat that is predominantly sand. Sand depths averaged between 28 and 41 inches across tide zones during the July 2009 survey. Beach width and sand depths appeared suitable for grunion spawning. Sand erosion was evident after January 2010 with greater beach slope, presence of cobbles, and exposure of small unvegetated sandstone reef paths in the swash zone.

Nearshore

The nearshore placement site is located off the coast of Oceanside between Loma Alta Creek and the municipal pier in nearshore waters. The habitat within the project footprint can be characterized as sandy subtidal habitat. The site contains no substrate supporting kelp canopy mapped in 2002, as well as no nearshore reefs at depths less than 30 feet.

Nearby Sensitive Resources

Below is a summary of nearby sensitive resources located in proximity to each placement site.

> Oceanside: Limited hard-bottom and vegetated habitats occur directly offshore, approximately 500 to 1,800 feet offshore and approximately 1,600 feet downcoast. The largest of the hard-bottom areas has low-relief rocks and cobble with localized occurrences of giant kelp, feather boa kelp, sea palm, and sea fan as well as common

occurrence of turf algae. Surfgrass is localized with sparse occurrence. Surfgrass, feather boa kelp, and turf also occur on a smaller, adjacent patch reef (Figure 3.5-7).

Carlsbad: The closest intertidal surfgrass was mapped within a half-mile downcoast of the site in 2000. Nearshore reef and scattered rocks occur approximately 200 feet offshore. The greatest concentration of reef occurs offshore the central portion of the receiver site. Hard-bottom with understory algae also occurs approximately 200 feet offshore the placement site boundaries. Surfgrass, sea palm, and feather boa kelp were observed on reef heights ranging from 1 to 4 feet on the central portion of the reef within 450 and 700 feet of the site boundaries during 2009. Giant kelp, sea palm, feather boa kelp, and sea fans were located on reef approximately 1,200 feet offshore the boundaries of the receiver site. A well-developed kelp bed was mapped approximately 1,400 feet offshore the site boundaries in 2008 (Figure 3.5-8).

Oceanside Nearshore**:** The placement site is more than 500 feet from substrate supporting kelp canopy mapped in 2002. The City of Oceanside wastewater discharge pipeline is located 500 feet downcoast, and the closest nearshore reefs at depths of less than 30 feet are located approximately 2,500 feet away (Figure 3.5-7).

Critical Habitat

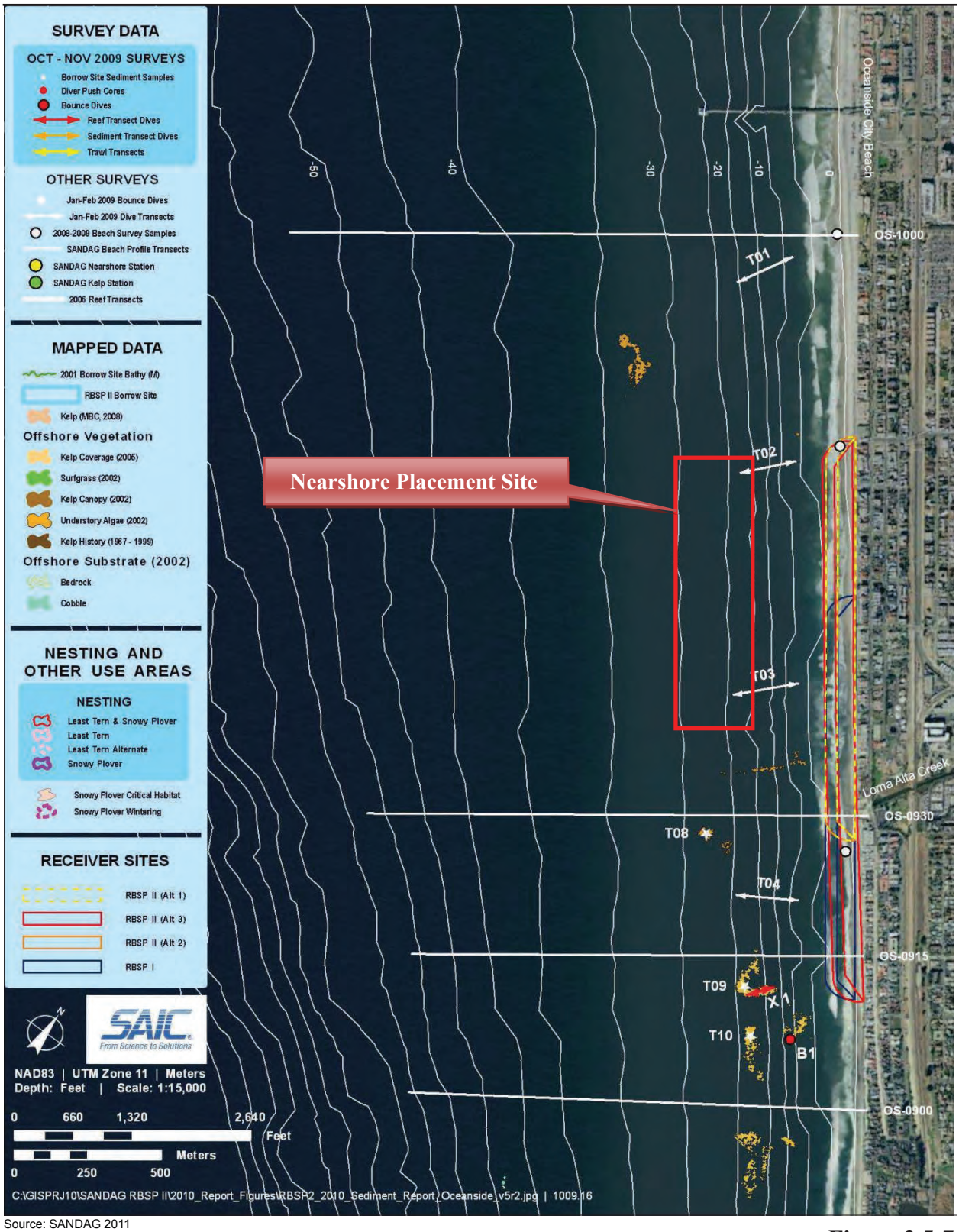
No critical habitat exists within or in proximity to the Oceanside, Carlsbad, or nearshore placement sites.

Essential Fish Habitat

As described previously, EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The entire coastal area ranging from the mean high tide level to offshore depths (adjacent to placement sites) is designated as EFH for Pacific groundfish and coastal pelagic species; thus, EFH occurs within the materials disposal/reuse area.

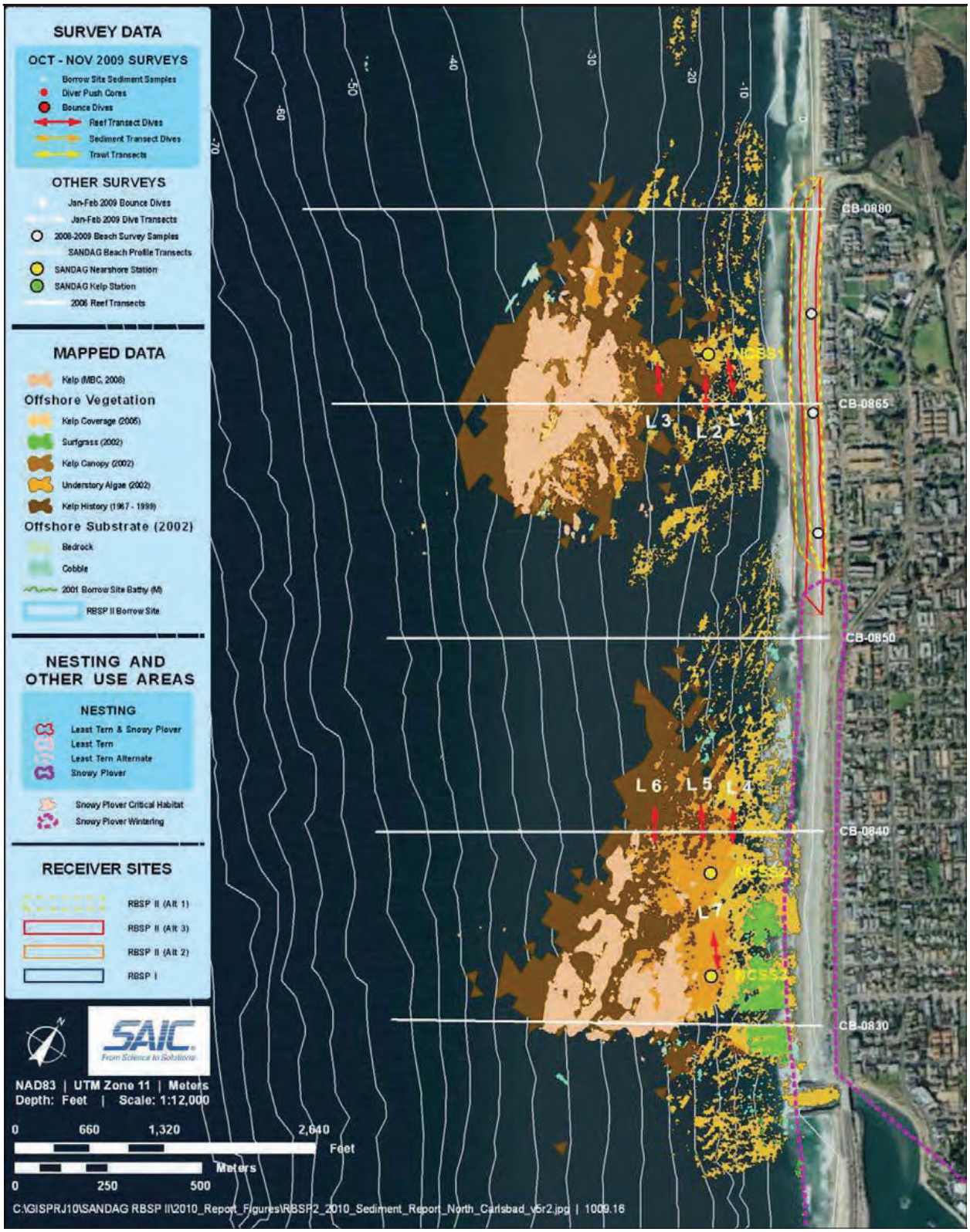
Rare, Threatened, or Endangered Species

This section summarizes the sensitive fauna (animals) known to occur, or with the potential to occur, within the littoral zone and nearshore placement sites.



Source: SANDAG 2011

Figure 3.5-7
Sensitive Habitats and Nearshore Resources in Vicinity of Proposed Oceanside Nearshore and Beach Placement Sites



Source: SANDAG 2011

Figure 3.5-8
Sensitive Habitats and Nearshore Resources in Vicinity of North Carlsbad Placement Site

Federally and State Listed Species

No federally or state listed species are known to breed within any of the placement sites. The closest federally listed species breeding habitat for the endangered least tern and threatened snowy plover nesting sites and are located more than 4 miles upcoast at Marine Corps Base Camp Pendleton. The closest potential snowy plover wintering area is located within 200 feet of the downcoast boundary of the receiver site.

Four species of sea turtles listed as federally endangered are known to migrate and forage along the California coast in nearshore and offshore habitats. These species are the green sea turtle, leatherback sea turtle, loggerhead sea turtle, and olive ridley sea turtle. Green sea turtles and loggerhead sea turtles are known to forage on benthic macroinvertebrates that occur in rooted submerged aquatic plants in addition to unvegetated subtidal flats. Leatherbacks, however, feed primarily on jellyfish in open waters. Olive ridley sea turtles are also mainly pelagic; therefore, all four species of turtle have the potential to migrate through and forage within and near the Oceanside nearshore placement site.

These endangered marine turtles occasionally are sighted in warm-water areas of estuaries and bays in the region, but do not come to shore on the beaches of the placement sites.

State Fully Protected Species

California brown pelican is a State of California fully protected species. They are found in the open ocean and other coastal salt waters along the southern California coast throughout the year. This species is tolerant of human activity near its daytime roosts and readily utilizes various manmade structures (e.g., piers, breakwaters, buoys) as roosting sites. This species was observed during 2009 and 2010 surveys of the beach placement sites and has potential to forage in the nearshore placement site.

Managed Game Species

California grunion is not a rare, threatened, or endangered species, but is a managed game species by CDFW and is therefore described herein. They spawn on sandy beaches primarily from March through August, with their peak season falling between late March and early June.

Generally, sand beaches with gentle slopes and sufficient beach width above the mean high tide line to support egg incubation would be suitable, while beaches with substantial cobble, steep slopes, or with complete wave run-up over average high tides would not be suitable. At the Oceanside placement site, potential habitat suitability for grunion spawning may be limited due

to wave run-up to riprap under spring high tide conditions, but suitability may vary over the course of the grunion season with seasonal migration of sand. At the Carlsbad placement site, beach width and sand depths appeared suitable for grunion spawning. Sand erosion was evident after January 2010 with greater beach slope, presence of cobbles, and exposure of small unvegetated sandstone reef patches in the swash zone.

Marine Mammals

Marine mammals are protected by Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972. Harbor seals and California sea lions are common in the nearshore coastal waters off southern California and have the potential to occur within the nearshore placement site. California gray whales migrate along the southern California coast between summer feeding grounds in the Bering Sea and winter calving grounds in Baja California. The nearshore placement site lies within the nearshore migration path, which extends from the shoreline to approximately 12 miles offshore. Common dolphins and bottlenose dolphins occur in the surf zone and in offshore waters. Pacific white-sided dolphins and Risso's dolphins also are known to occur seasonally in waters of southern California.

3.5.2 SIGNIFICANCE CRITERIA

Direct and indirect impacts may be temporary (short-term) or permanent (long-term). These impact categories are defined in Section 3.0.3.

For the purpose of this analysis, the following applicable thresholds of significance have been used to determine whether implementing the project would result in a significant impact. These thresholds of significance are based on Appendix G of the CEQA Guidelines as well as criteria developed in previous lagoon restoration projects (i.e., Bolsa Chica Lowlands Restoration Project [Chambers Group 2001]). These thresholds were previously considered for the Bolsa Chica Lowlands Restoration Project and the San Elijo Lagoon Restoration Project (Corps and County of San Diego 2014). Incorporating significance criteria derived from these projects, in addition to those included in Appendix G, provides additional context for evaluating impacts to the unique biological resources of lagoon ecosystems as a result of restoration/enhancement activities.

A significant impact to biological resources would occur if implementation of the proposed project would result in any of the following:

A) Substantial adverse impacts on any riparian, aquatic or wetland habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS;

All habitats within the BSA, as well as aquatic habitats that may be located offshore of the sand disposal locations, are considered sensitive based on local, regional, and state guidance, with the exception of eucalyptus woodland, disturbed habitat, and other land cover types such as developed. For the purposes of this project, the term "substantial" is defined as a temporary or permanent change that would cause a loss of more than 50 percent of a sensitive habitat, because greater than 50 percent loss of any sensitive habitat is considered to have the potential to threaten the continued existence of a sensitive species known to occur within Buena Vista Lagoon.

B) Substantial adverse impacts 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;

The majority of Buena Vista Lagoon is a potential jurisdictional water/wetland protected by Corps, CDFW, and/or RWQCB. For the purpose of this project, a significant impact on a federally protected wetland would include a loss of wetlands (temporary or permanent) in terms of aquatic function and value. Potential water quality impacts (including turbidity, salinity, etc.) associated with wetland function and value are addressed in Section 3.4 Water Quality of this EIR and are not addressed herein.

C) Substantial adverse impacts, 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 CDFW or USFWS that is expected to occur within the BSA;

For the purposes of this project, the term "substantial" is defined as a temporary or permanent change that would cause a decline, or prevent the survival and recovery of, a local population of a listed species to below self-sustaining levels within Buena Vista Lagoon. Data are lacking for most species regarding the size of a self-sustaining population for a given area of habitat; however, for the purposes of this analysis, a 50 percent decline in the lagoon breeding population (i.e., movement out of lagoon and not mortality) or a temporary loss of more than 50 percent of the suitable nesting habitat for that population at the lagoon, was considered a threat to the continued existence of the Buena Vista Lagoon population (Chambers Group 2001). In addition, the direct loss of adults, eggs, or young of species listed as endangered or threatened would be a significant impact. For example, an impact would be considered less than significant if the selected Enhancement Project alternative would ultimately contribute to the long-term increase

of the population even though construction would result in a temporary loss of 35 percent of the nesting areas or breeding habitat for species listed as endangered or threatened.

In addition, an increase in noise to a level that would substantially modify breeding or foraging behavior of rare, threatened, or endangered species or species of special concern would be considered significant.

D) Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedance in the use of native wildlife nursery sites;

For the purposes of this project, impacts would be considered significant if the project would substantially interfere with wildlife access to foraging habitat, breeding habitat, water sources, or other areas necessary for reproduction, or if the project would introduce roads/trails or other permanent features that would impede wildlife movement through a local or regional wildlife corridor.

E) Conflict with any local policies or ordinances or conservation plans protecting biological resources, such as tree preservation policies or ordinances, Habitat Conservation Plan or Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plans.

For the purposes of this project, an inconsistency with goals or provisions of the MHCP, Carlsbad HCP, and Oceanside Subarea Plan, as well as an inconsistency with the Carlsbad or Oceanside Local Coastal Programs (LCPs) would be considered potentially significant.

3.5.3 IMPACT ANALYSIS

Lagoon Enhancement

Freshwater Alternative

Sensitive Riparian and Natural Vegetation Communities

Temporary and permanent impacts would occur to vegetation communities as a result of implementing the proposed Freshwater Alternative. Short-term changes would result from vegetation removal within areas designated for vegetation drying and construction staging, as these areas would be restored to pre-construction conditions after project implementation. Temporary loss of habitat within the construction limits would also occur. Long-term permanent

impacts would result from project construction and direct impacts from grading, dredging, and sediment excavation. Impacts to vegetation communities are detailed in Table 3.5-3. Potential impacts are described in further detail below.

Short-term/Temporary Direct Impacts

Implementation of the Freshwater Alternative would result in direct temporary impacts to 71 percent of the project area (Table 3.5-3). Approximately 157 acres of vegetation would be temporarily displaced during vegetation removal, sediment removal, and grading and dredging activities, as seen in Figure 3.5-9. While it is the intent of this alternative to allow existing vegetation to remain in place to the extent feasible (e.g., southern coastal salt marsh tidal habitat would be left in place to the extent possible), acreages presented in Table 3.5-3 represent a worst-case scenario for vegetation communities that may be impacted. The primary concern for temporary loss of habitat is reduced availability of food and shelter for resident and migratory species that rely on the lagoon. As shown in Table 3.5-3, construction would result in greater than 50 percent temporary loss of sensitive riparian habitat (coastal and valley freshwater marsh and open water vegetation types). The temporary loss of these habitats may threaten local populations of sensitive resident species, as described further below. **Temporary, direct impacts to beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub: *Baccharis*-dominated are therefore considered significant (Criterion A).**

Table 3.5-3
Temporary Direct Impacts to Vegetation Communities, Freshwater Alternative (acres)[1]

Vegetation Community	Grading/ Dredging	Vegetation Drying	Staging areas	Total Impacts	% Impacted in Project Area
Riparian and Wetlands					
Beach	0.4	0.0	0.1	0.5	76%
Coastal and valley freshwater marsh	55.4	1.2	0.5	57.2	59%
Nonnative riparian	0.3	0.5	0.1	0.9	21%
Southern willow scrub	0.0	0.1	0.0	0.1	3%
Open water	99.8	0.0	0.1	99.8	93%
Southern coastal salt marsh nontidal	0.4	3.5	1.5	5.4	36%
Uplands					
Coastal scrub	0.0	0.4	0.0	0.4	60%
Diegan coastal sage scrub: *Baccharis*-dominated	0.0	0.4	0.3	0.7	53%
Nonnative grassland	0.2	0.0	2.1	2.2	93%
Other Cover Types					
Disturbed habitat	0.0	0.0	0.4	0.4	59%
Urban/developed	0.3	0.0	0.1	0.5	6%
Total	**156.7**	**6.1**	**5.1**	**167.9**	**71%**

[1] Numbers may not sum exactly due to rounding.

Temporary impacts to riparian wetland vegetation communities, such as nonnative riparian, southern coastal salt marsh nontidal, and southern willow scrub are not considered significant because greater than 50 percent of the local habitat would remain available to local residents and migratory species during construction. Additionally, vegetation removal during the breeding season would be avoided. Prior to construction, sensitive "no construction" zones with breeding habitat for federally listed or state-listed species would be identified and fenced or flagged to avoid impacts outside of the identified limits of disturbance, as described in Table 2-9, Standard Construction Practices. These areas would be monitored throughout construction by a qualified biologist. **Temporary direct impacts to nonnative riparian and southern coastal salt marsh nontidal, and southern willow scrub are therefore considered less than significant (Criteria A and B).**

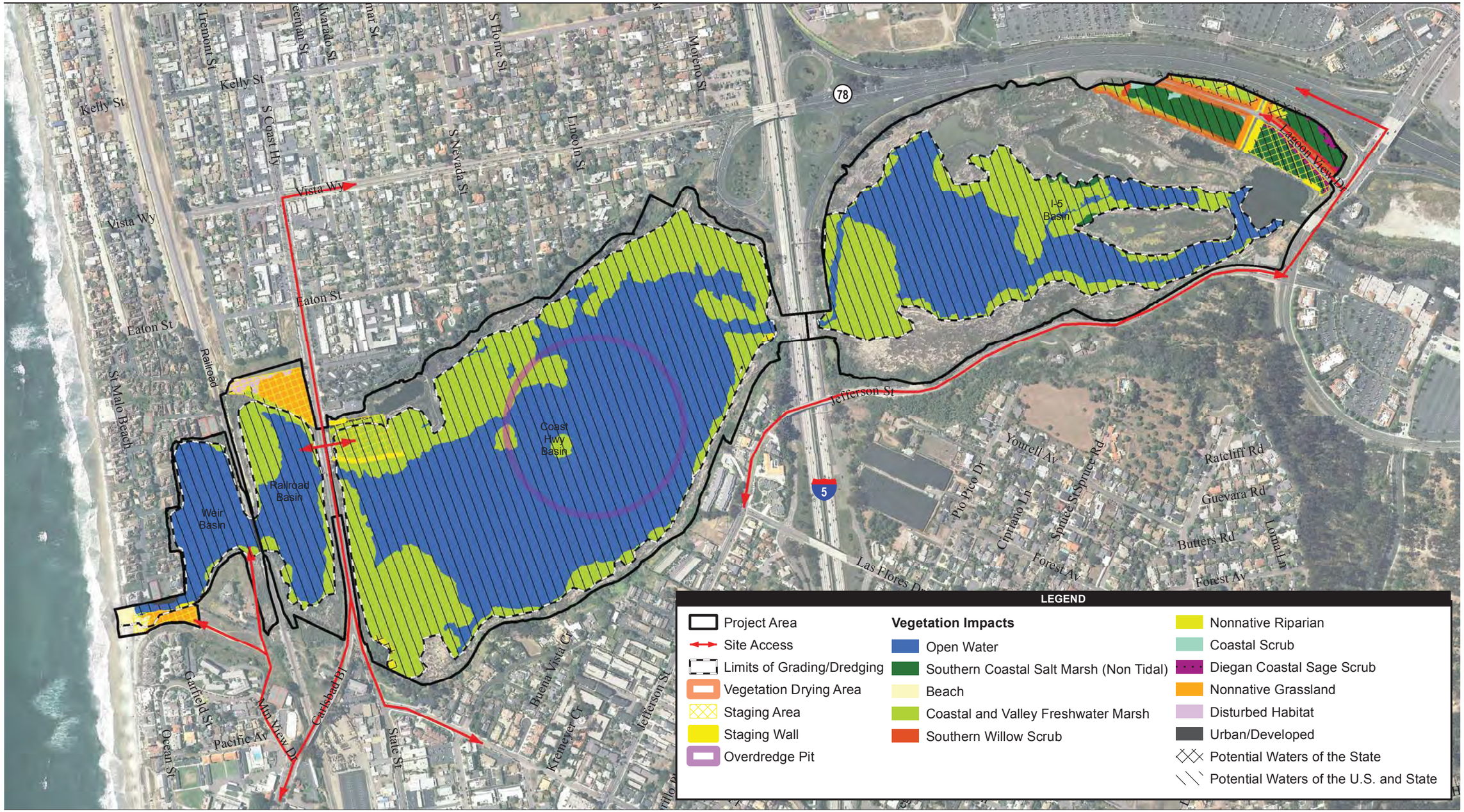
Implementation of the Freshwater Alternative would also result in temporary impacts to vegetation types within vegetation drying areas and staging areas, primarily located on the outer perimeters of the Weir Basin, Railroad Basin, and I-5 Basin (Figure 3.5-9). At these vegetation drying areas and at staging areas, existing vegetation would be crushed and/or removed, and the ground could be compacted. Approximately 6 acres would be temporarily impacted at the proposed vegetation drying areas (Table 3.5-3). Approximately 5.1 acres would be impacted within the proposed staging areas (Table 3.5-3). It should be noted that these areas would be restored to pre-construction conditions after project implementation.

Short-term/Temporary Indirect Impacts

Construction activities would remain within the limits of disturbance as seen in Figure 3.5-9. Indirect impacts as a result of construction may include construction-generated dust, sedimentation, and runoff into surrounding vegetation communities and open water. However, implementation of BMPs, delineation of sensitive "no construction" zones, and construction monitoring would be incorporated into the project, and **short-term indirect impacts would be less than significant (Criteria A and B).**

Long-term/Permanent Direct Impacts

Long-term permanent impacts to vegetation communities and open water as a result of implementation of the Freshwater Alternative consist of habitat conversion as a result of vegetation removal, sediment removal, and dredging. Vegetation proposed to replace existing vegetation communities as a result of habitat conversion for each alternative is provided in Table 3.5-4. Generally, the Freshwater Alternative would result in a decrease in coastal and valley



Source: Sangis 2014; SANDAG 2012; AECOM 2014; Everest 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-9
Freshwater Alternative Impacts to Vegetation Communities and Habitats

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freshwater marsh. However, new communities and cover types would be created, including deep open water, a cattail maintenance area, a freshwater habitat transition zone and transitional habitat. Acreages of beach, open water, and southern willow scrub would increase. The Freshwater Alternative incorporates hydrological modification in the form of replacement of the 50-foot weir at the ocean outlet with a wider, 80-foot weir. This would provide better water circulation for vegetation communities within the lagoon. Also, removal of sediment under the Carlsbad Boulevard bridge would result in a deeper channel restored to original design dimensions, and removal of cattails currently encroaching into open water habitat would result in increased water circulation.

Table 3.5-4
Existing and Proposed Habitat Distribution (acres)[1]

Habitat Type	Existing Condition	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative (Options A & B)
Beach	0.6	1.3	0.8	0.8/0.8
Coastal and valley freshwater marsh	96.2	24.7	--	10.2/10.2
Coastal scrub	0.6	0.6	0.5	0.7/0.7
Deep open water	--	4.5	4.0	5.0/5.0
Diegan coastal sage scrub	<0.1	0.6	0.8	2.1/2.1
Diegan coastal sage scrub: *Baccharis*-dominated	1.3	1.6	1.3	1.3/1.3
Disturbed habitat	0.7	--	--	--
Eucalyptus woodland	0.5	--	--	--
Freshwater habitat transition zone	--	9.2	--	--
Mudflat	--	--	20.0	4.7/4.9
Nonnative grassland	2.4	--	--	--
Nonnative riparian	4.2	--	--	--
Open water	106.8	133.4	51.0	99.3/98.6
Cattail maintenance area (proposed)[2]	--	32.9	--	30.5/30.5
Riparian enhancement	--	4.5	6.6	4.6/4.6
Southern coastal salt marsh (nontidal)	14.8	14.8	23.2	17.9/17.9
Southern coastal salt marsh high	--	--	55.0	26.5/26.5
Southern coastal salt marsh low	--	--	33.2	6.3/6.5
Southern coastal salt marsh mid	--	--	35.4	20.3/20.6
Southern willow scrub	2	2.2	--	--
Urban/developed	8.7	8	6.5	6.7/6.7
Totals	**238.3**	**238.3**	**238.3**	**238.3/238.3**

[1] Numbers may not sum exactly due to rounding and slight differences in project area.
[2] Proposed cattail maintenance areas would function biologically as coastal and valley freshwater marsh; total acreage of both categories would be 57.6 acres under the Freshwater Alternative and 40.7 under the Hybrid Alternative (Options A and B).

With avoidance measures to prevent direct construction impacts to nesting species and species using and occupying habitats, and with improved lagoon ecology, increased foraging for species, and no overall loss of lagoon resources, **permanent direct impacts to sensitive vegetation**

communities and open water with implementation of the Freshwater Alternative are considered less than significant (Criteria A and B).

Long-term/Permanent Indirect Impacts

With the implementation of avoidance and minimization measures preventing construction-generated dust, sedimentation, and runoff into areas outside of the limits of construction, no permanent indirect impacts are expected. The pedestrian bridge and the proposed Boardwalk directly adjacent to Carlsbad Boulevard would be elevated above the habitat. Educational elements and frequent placement of trash receptacles would limit potential impacts to vegetation from debris/littering. Freshwater vegetation communities directly adjacent to the limits of construction would be contiguous with freshwater habitat within the completed project, and improved water circulation within the lagoon and immediately adjacent to the lagoon would be expected. **Therefore long-term, indirect impacts would be less than significant (Criteria A and B).**

Jurisdictional Waters and Wetlands

Short-term/Temporary Direct Impacts

Construction of the Freshwater Alternative would result in temporary or short-term direct impacts to jurisdictional waters and wetlands due to construction operations, which include grading/dredging, vegetation drying areas, and staging areas. Of the approximately 224.2 acres of jurisdictional area present in the BSA, 164 acres would be directly impacted by construction (156 acres from grading/dredging, 5.9 acres from vegetation drying, and 2.1 acres from staging areas). Of this, approximately 1.2 acres is considered nonwetland riparian habitats under the jurisdictional purview of CDFW, consisting of eucalyptus woodland and nonnative riparian along the upper banks of the lagoon, and therefore considered associated riparian habitat of the lagoon. These areas do not support a dominance of hydrophytic vegetation and therefore were determined not to be a three-parameter wetland. These impacts would include the short-term loss of vegetation as described above, and potential impacts to water quality associated with construction. As described in Section 3.4 Water Quality and Aquatic Sediment Quality, several project design features have been incorporated to minimize temporary impacts on water quality within the lagoon. Due to the temporary nature of the direct impacts, overall project objective of restoration of coastal wetlands, and with implementation of project design features and compliance with regulatory requirements for BMPs, **short-term direct impacts to jurisdictional waters and wetlands associated with the Freshwater Alternative are considered less than significant (Criteria A and B).**

Short-term/Temporary Indirect Impacts

Short-term indirect impacts to jurisdictional waters would include changes in habitat or water quality that may result from project implementation. Indirect impacts to vegetation would include construction-generated dust, sedimentation, and runoff into surrounding waters.

However, implementation of BMPs, delineation of sensitive "no construction" zones, and construction monitoring would be incorporated into the project, and **short-term indirect impacts would be less than significant (Criteria A and B).**

Long-term/Permanent Direct Impacts

Prior to construction of the Freshwater Alternative, approximately 224.2 acres of the 557-acre BSA was determined to be potential jurisdictional waters of the U.S. and CDFW jurisdictional areas. Following construction of the Freshwater Alternative, conversion from one wetland type to another would occur due to dredging of channels/basins and improvements to hydrologic function. Implementation of the Freshwater Alternative would result in habitat type conversion only and would not result in permanent loss of jurisdictional waters and wetlands of the U.S. and state. Additionally, there would be an increase in open water, and habitat value and function are expected to increase relative to pre-enhancement conditions. Therefore, **the long-term direct impacts to jurisdictional waters and wetlands associated within the Freshwater Alternative would not be significant (Criteria A and B).**

Long-term/Permanent Indirect Impacts

Long-term indirect impacts to jurisdictional waters would include changes in habitat or water quality that may result from project implementation. Indirect impacts to waters may include construction-generated dust, sedimentation, and runoff into areas outside of the limits of construction; no permanent indirect impacts are expected. The proposed Boardwalk would be elevated above the habitat, directly adjacent to Carlsbad Boulevard. Educational elements and frequent placement of trash receptacles would limit potential impacts to vegetation from debris/littering. Waters directly adjacent to the limits of construction would be contiguous with freshwater habitat within the completed project, and improved water circulation within the lagoon and immediately adjacent to the lagoon would be expected. Therefore, **the long-term indirect impacts to jurisdictional waters and wetlands associated within the Freshwater Alternative would be less than significant (Criteria A and B).**

Fish Resources

Short-term/Temporary Direct Impacts

Implementation of the Freshwater Alternative could result in temporary direct impacts to fish resources, within and adjacent to the construction limits. Impacts from construction activities may include harassment, displacement, reduction in recruitment and population densities, mortality, and water quality impairment.

In-water construction activities may cause harassment, displacement, and mortality of fish. Harassment and displacement can cause physiological stress; affect normal behaviors; reduce tolerance to disease and toxicants; and cause fish to relocate from optimal rearing, feeding, and predator avoidance habitat to less optimal habitat. Construction activities may occur during the spawning time period for many of the resident freshwater fish species causing nest abandonment and failure, direct destruction of nests, and mortality. These impacts can reduce feeding efficiency, condition, survival rates, and recruitment, and can increase predation. The overall effect on fish resources from these impacts would be decreased population health and densities (Bash et al. 2001).

Vegetation removal, dredging, and grading would disturb benthic sediments; this would mobilize sediments and increase turbidity, which could temporarily impair water quality in the lagoon. Equipment staging and construction vehicle traffic could contribute to sediment mobilization if such activities cause erosion of soils and these soils enter the waters of the lagoon. Sediment mobilization, increased turbidity, and the resulting impaired water quality could affect fish habitat and physical health.

Turbidity is a measure of the amount of suspended particles or sediments, typically inorganic materials, within a body of water. Turbidity is an optical property of water where suspended and dissolved materials such as silt, clay, finely divided organic and inorganic matter, chemicals, plankton, and other microscopic organisms cause light to be scattered rather than transmitted in straight lines (Bash et al. 2001). Suspended sediments originate from both natural processes and human-related activities. Temporary variation in weather patterns, particularly precipitation and runoff, and land-use projects often result in periodic pulses or chronic levels of suspended sediments in water bodies. Turbidity levels above ambient may affect fish by altering their physiology, behavior, and habitat, all of which may lead to physiological stress, reduced survival rates, and reduced population numbers (Bash et al. 2001).

Fish population levels and survival have been linked to levels of turbidity. Prolonged exposure to high levels of suspended sediment may cause a loss of visual capability in fish, leading to

reduced feeding efficiency and growth rates, a thickening of the gill epithelia reducing respiratory function, clogging and abrasion of gill filaments, and increased stress levels that can reduce tolerance to disease and toxicants (Waters 1995). High levels of suspended sediments can alter movements and redistribute fish populations through avoidance. Fish do not occupy areas unsuitable for survival unless they have no other option. Many fish are sight feeders, and turbid waters reduce the ability of these fish to locate and feed on prey. Some fish, particularly juveniles, could become disoriented and leave optimal feeding and predator avoidance habitat, ultimately reducing growth rates and survival. Some fish species will not spawn in excessively turbid water (Bell 1991). In addition, construction-generated sedimentation may settle on fish nests, potentially causing egg suffocation and nest failure. Therefore, project activities could temporarily reduce available fish habitat, recruitment, and population densities if construction-related increases in turbidity were to preclude a species from occupying habitat required for specific life stages, or suffocate eggs and cause nest failure.

Cofferdam construction associated with weir replacement could temporarily impact fish within the general vicinity of construction activities. Sheetpiles would be driven into bottom sediments using an impact or vibratory hammer. Pile driving can create underwater sound waves and pressures that can negatively affect fish. Sound is defined as small disturbances in a fluid from ambient conditions through which energy is transferred away from a source by progressive fluctuations of pressure or sound waves (Caltrans 2009). Sound waves are always produced by vibrating objects such as sheetpile being driven by a vibratory or impact hammer. As the vibrating surface moves, it compresses the molecules in the adjacent medium, creating a high-pressure region (Caltrans 2009). As the object vibrates back to its original position, the molecules in contact with the vibrating surface produce a low-pressure region (Caltrans 2009). These areas are known as compressions and rarefactions, respectively (Caltrans 2009). The magnitude of the difference between a paired compression and rarefaction dictates potential impacts on fish. Impacts can include change in behavior, decreased fitness, increased predation risk, physical injury, and mortality (Caltrans 2009). The severity of impacts depends on the intensity and characteristics of the sound, the distance and location of the fish in the water column relative to the sound source, the size and mass of the fish, and the fish's anatomical characteristics (Caltrans 2009).

An interagency working group, including NMFS, established interim criteria for evaluating underwater noise impacts on fish from impact pile driving. These criteria are defined in the document titled *Agreement in Principle for Interim Criteria for Injury to Fish from Pile Driving Activities* (Fisheries Hydroacoustic Working Group 2008). This agreement identifies a peak

sound pressure level of 206 decibels (dB) and an accumulated sound exposure level (SEL)[1] of 187 dB as thresholds for injury to fish greater than or equal to 2 grams (g). For fish less than 2 g, the accumulated SEL threshold is reduced to 183 dB. Although no formal agreement has been made on a behavioral threshold, NMFS uses the 150-dB root mean square as the threshold for adverse behavioral impacts (NMFS 2009).

The NMFS criteria used for underwater noise levels were established specifically for impact pile driving and are not intended to be applied to vibratory driving. No formal agreement has been made regarding injury thresholds for vibratory pile driving. However, a staff member from NMFS has suggested that thresholds for vibratory driving should be 20 to 30 dB higher than for impact driving (NMFS 2009). In addition, detailed field studies for the Mad River Bridges Replacement Project concluded no immediate significant physical impacts for fish exposure on cumulative SEL values less than 194 dB from impact pile driving exist at the project site (Caltrans 2009). In the current regulatory environment, vibratory pile driving is generally viewed as a preferred method and mitigation measure for pile driving and not as a substantial source of concern for injury to fish.

As described above, there are various short-term construction activities that would have the potential to cause direct impacts to fish populations in the lagoon. In-water construction could result in increased sediment and turbidity as well as sound waves and pressure, all of which can adversely affect and disrupt fish. The fish species detected within the BSA include the native California killifish and striped mullet; other fish species known to occur in the lagoon are nonnative. Although there would be impacts to nonnative and native fish species within the BSA, none of these are special-status species. **Since no special-status fish species occur in the lagoon, temporary direct impacts resulting from the Freshwater Alternative would not be considered significant (Criterion C).**

As described above, construction activities may cause adverse effects to foraging habitat, breeding habitat, or other areas necessary for reproduction by resident freshwater fish species. However, fish populations would continue to be able to migrate and travel through portions of the lagoon to areas less affected by construction activities, such as locations more distant from the weir during weir replacement activities to avoid sound waves and pressures from pile driving. While in-water construction activities would cause some direct impacts to fish species and may temporarily affect their foraging or breeding sites, these impacts would be short-term

[1] Sound exposure level (SEL) is defined as the constant sound level acting for 1 second, which has the same amount of acoustic energy as the original sound. Expressed another way, SEL is a measure of the sound energy in a single pile driver strike. Accumulated SEL ($SEL_{accumulated}$) is the cumulative SEL resulting from successive pile strikes. $SEL_{accumulated}$ is based on the number of pile strikes and the SEL per strike; the assumption is made that all pile strikes are of the same SEL.

and would not negate the long-term recovery and survival of local fish populations. Thus, **the Freshwater Alternative would not substantially interfere with the movement of any native resident or migratory fish or with established native resident or migratory wildlife corridors, or impedance in the use of native wildlife nursery sites (Criterion D).**

Short-term/Temporary Indirect Impacts

Potential temporary indirect impacts from implementing the Freshwater Alternative may include runoff from staging and work areas, increased sedimentation, accidental spills of fuels and lubricants, and increased turbidity within and adjacent to the limits of construction. These potential impacts would degrade water quality and, in turn, would impact fish resources in Buena Vista Lagoon. In addition, the potential exists for contaminants such as fuels, lubricants, hydraulic fluids, and other chemicals/compounds used in construction activities to be introduced into the lagoon from direct spill or through surface runoff from staging and work areas. Contaminants may be toxic to fish or may alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival. Acute levels of contaminants also can cause mortality of fish. Implementation of BMPs and other measures in compliance with existing regulations would minimize the risk of these impacts occurring. Potential indirect impacts would be temporary because baseline water quality conditions would return shortly following completion of proposed project activities. The risk of temporary impacts to nonnative and non-special-status fish currently in the lagoon would be minimal due to regulatory requirements, and no special-status fish species exist in the lagoon. **Temporary indirect impacts resulting from the Freshwater Alternative would not be considered significant (Criterion C).**

Long-term/Permanent Direct Impacts

Implementation of the Freshwater Alternative would have permanent, long-term impacts on the fish resources in Buena Vista Lagoon. Impacts from enhancement activities on habitat availability and quality, as well as on water quality, would have long-term beneficial impacts on fish and fish populations. No impacts on species assemblages or species diversity would occur.

Sedimentation caused by accelerated eutrophication and poor flushing rates has resulted in shallow water with encroaching stands of emergent vegetation throughout much of the lagoon. Such conditions are characteristic of poor-quality freshwater fish habitat and poor water quality. Systems having accelerated rates of eutrophication typically continue to degrade through time resulting in a reduction of available fish habitat and water quality and a concomitant reduction in fish species diversity and population densities.

Enhancement activities under the Freshwater Alternative would focus on removal of emergent vegetation encroaching into open water habitat and decreasing vegetation densities throughout the lagoon. This enhancement would increase open water habitat by approximately 28 acres and provide additional habitat for adult fish. Dredging these areas would remove nutrient-rich sediments from the lagoon and minimize the potential for emergent vegetation to recolonize and expand back into open water habitat. Removal and thinning of emergent vegetation would reduce sedimentation rates (eutrophication) and increase water circulation resulting in improved water quality. Increased circulation would improve dissolved oxygen levels, which would improve fish habitat suitability.

Two deep water areas would be created, through dredging, under the Freshwater Alternative as an additional enhancement measure and would create approximately 4.5 acres of deep, open water fish habitat. Each area would be approximately 9 feet deep and lined with gravel to provide additional spawning and rearing habitat. The deep water habitat would be created nearshore in protected areas to minimize nest failure from disturbance by wind and waves. The deep water areas would provide a range of water depths, which is important for the seasonal habitat requirements of freshwater fish. Deep water habitat would also provide refugia during harsh environmental or poor water quality conditions.

Buena Vista Lagoon provides recreational freshwater angling opportunities that are popular with local residents with angling efforts primarily directed toward largemouth bass and bluegill. Implementation of enhancement activities associated with the Freshwater Alternative and described above would benefit the recreational fishery by ultimately increasing the stability and sustainability of fish populations. Although there would be temporary indirect impacts to nonnative and native fish species within the BSA, none of these are special-status species. **Long-term direct impacts would be less than significant (Criteria A and B).**

Long-term/Permanent Indirect Impacts

Permanent indirect impacts resulting from implementation of the Freshwater Alternative include improved water circulation, reduced rate of eutrophication, and an overall improvement to water quality. Post-project water quality would support a healthy, naturally functioning freshwater environment that would be beneficial to freshwater fish resources. **Implementation of the Freshwater Alternative would be less than significant (Criteria A and B).**

Special-Status Listed Flora

No federally listed or state-listed rare, threatened, or endangered plant species were observed within the construction limits of the Freshwater Alternative. One special-status plant species,

southwestern spiny rush (CNPS List 4.2), is known to occur in the I-5 Basin, within coastal and valley freshwater marsh habitat (Figure 3.5-10). Temporary direct impacts to southwestern spiny rush in the form of vegetation removal and mortality of individuals within the vegetation drying areas and staging areas may occur. The regulatory requirement to implement BMPs would minimize indirect impacts to plants located adjacent to the construction limits (e.g., construction-generated dust, runoff, and sedimentation). **Therefore, significant temporary direct impacts to special-status plant populations are anticipated with implementation of the Freshwater Alternative (Criterion C).**

Special-Status Listed Fauna

Impacts may include the short-term loss of nesting and/or foraging habitat for special-status wildlife species resulting from construction activities and maintenance activities. Of the 114 special-status wildlife species with a potential to occur within the BSA, seven species are federally and/or state listed. These include the light-footed Ridgway's rail, western snowy plover, California least tern, least Bell's vireo, southwestern willow flycatcher, Belding's savannah sparrow, and coastal California gnatcatcher. Impacts to special-status wildlife species habitat are provided in Table 3.5-5 and are separated into two types of short-term impacts: areas that occur within staging/vegetation drying areas and areas impacted by grading/dredging. While it is the intent of this alternative to allow much of the existing vegetation to remain in place, acreages presented in Table 3.5-5 represent a worst-case scenario for special-status wildlife species habitat that may be impacted. Temporary and permanent, direct and indirect impacts to special-status wildlife species are discussed further below.

Short-term/Temporary Direct Impacts

LIGHT-FOOTED RIDGWAY'S RAIL

Light-footed Ridgway's rail is a year-round resident in the lagoon, found in coastal and valley freshwater marsh and southern coastal salt marsh nontidal habitat. The Freshwater Alternative would directly impact 62.6 acres (56 percent) of existing suitable nesting habitat through habitat displacement during direct grading/dredging and staging/vegetation drying (Table 3.5-5 and Figure 3.5-10). These direct impacts would remove the coastal and valley freshwater marsh and southern coastal salt marsh nontidal habitat that supports this species. Additional direct impacts to this species include mortality of individuals.

The project would designate sensitive "no construction" zones that would be identified and fenced or flagged to avoid impacts outside of the limits of disturbance, as described in Table 2-9, Standard Construction Practices. **Temporary direct impacts to light-footed Ridgway's rail**

with implementation of the Freshwater Alternative are considered significant due to the potential for habitat loss and mortality (Criterion C).

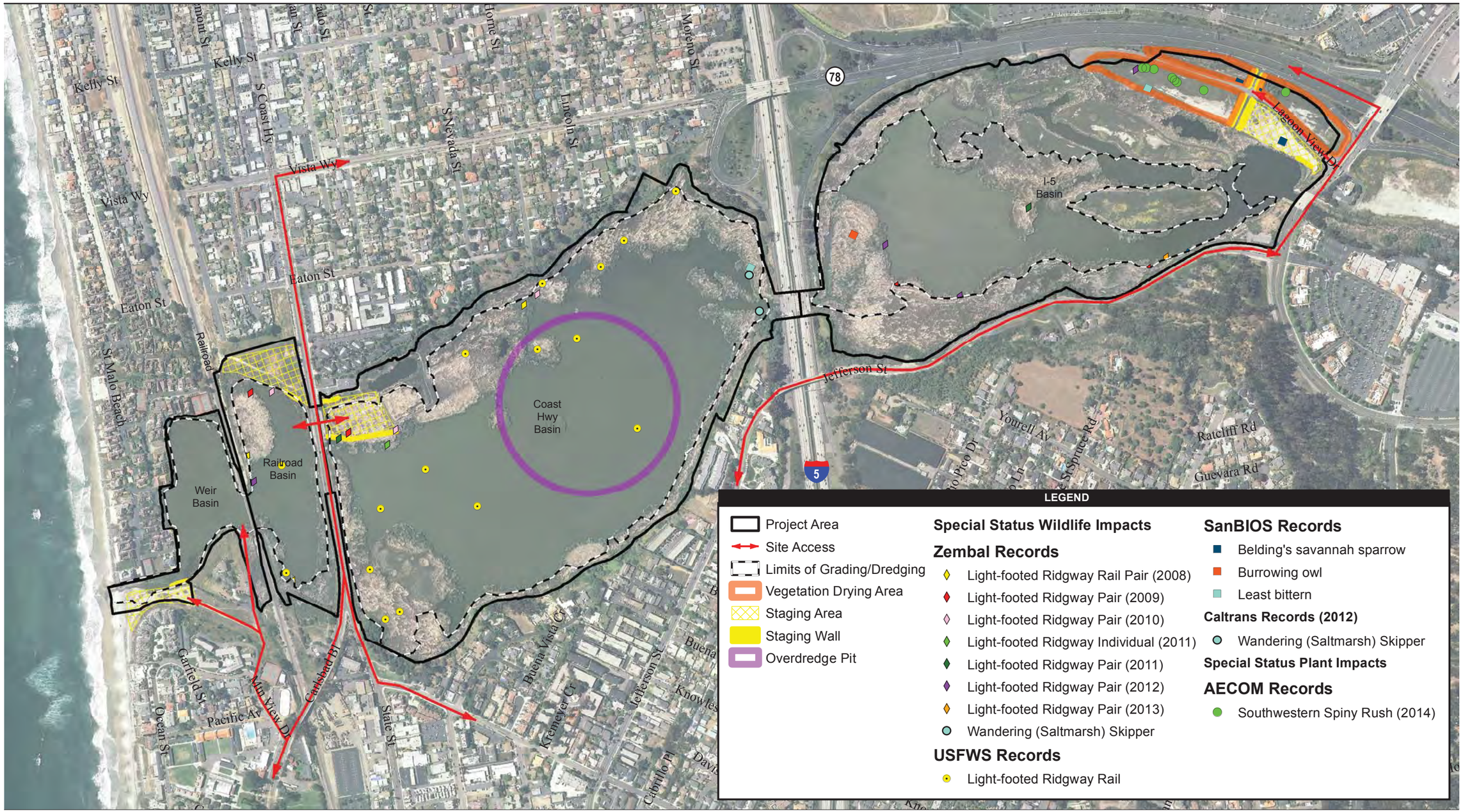
WESTERN SNOWY PLOVER

The western snowy plover suitable habitat is limited to the beach habitat west of the weir; impacts to 0.5 acre (77 percent) of beach habitat for this species would occur during construction (Table 3.5-5). Western snowy plover does not forage frequently within the BSA and likely no longer nests within the BSA as historical nesting sites within the BSA have been altered by anthropogenic factors. As mudflat habitats suitable for foraging do not occur within the BSA, plover is currently not likely to occur; thus, this species is not likely to be impacted. **Therefore, temporary direct impacts to western snowy plover from the Freshwater Alternative would be less than significant (Criterion C).**

CALIFORNIA LEAST TERN

California least tern is documented as annually foraging at Buena Vista Lagoon but is not known to breed in the lagoon. Impacts to 0.5 acre (77 percent) of beach, 99.8 acres (93 percent) of open water, and 5.4 acres (36 percent) of southern coastal salt marsh nontidal would occur as a result of grading/dredging and staging/vegetation drying for the Freshwater Alternative (Table 3.5-5). Approximately 106 acres (86 percent) of California least tern foraging habitat would be impacted as a result of construction for the Freshwater Alternative. No suitable nesting habitat occurs within the lagoon.

Sediment mobilization, increased turbidity, and the resulting impaired water quality could affect fish, which is the primary food of California least tern. However, foraging species like the least tern are highly mobile and move throughout the lagoon as well as up and down the coast; as such, the temporary loss of their potential foraging habitat is not expected to have a significant impact on these species. In addition, many of these areas post-implementation are expected to return to the same/similar habitat type but with improved conditions as a result of improved hydrology. **Therefore, temporary direct impacts to California least tern from the Freshwater Alternative would be less than significant (Criterion C).**



Source: Sangis 2014; SANDAG 2012; AECOM 2014; Everest 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-10
Freshwater Alternative Impacts to Special Status Species

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Table 3.5-5
Temporary Direct Project Impacts to Special-Status Wildlife Species Habitat, Freshwater Alternative (acres)[1]

Special-Status Species	Vegetation Community	Existing Habitat	Habitat Impacted by Vegetation Drying/Staging			Habitat Impacted by Grading/Dredging		Total Direct Impact to Existing Habitat	
			Vegetation Drying	Staging areas	Percent	Grading/ Dredging	Percent	Total	Percent
Light-footed Ridgway's rail	Coastal and valley freshwater marsh	96.2	1.2	0.5	2%	55.4	58%	57.2	59%
	Southern coastal salt marsh nontidal	14.8	3.5	1.5	34%	0.4	3%	5.4	36%
	Total	**111.0**	**4.7**	**2.0**	**6%**	**55.8**	**50%**	**62.6**	**56%**
Western snowy plover	Beach	0.6	0.0	0.1	8%	0.4	62%	0.5	77%
	Total	**0.6**	**0.0**	**0.1**	**8%**	**0.4**	**62%**	**0.5**	**77%**
California least tern	Beach	0.6	0.0	0.1	8%	0.4	62%	0.5	77%
	Open water	106.8	3.5	1.5	5%	99.8	93%	99.8	93%
	Southern coastal salt marsh nontidal	14.8	3.5	1.5	34%	0.4	3%	5.4	36%
	Total	**122.2**	**7.0**	**3.1**	**8%**	**100.5**	**82%**	**105.7**	**86%**
Least Bell's vireo and southwestern willow flycatcher	Southern willow scrub	2.2	0.1	0.0	3%	0.0	0%	0.1	3%
	Total	**2.2**	**0.1**	**0.0**	**3%**	**0.0**	**0%**	**0.1**	**3%**
Belding's savannah sparrow	Southern coastal salt marsh nontidal	14.8	3.5	1.5	34%	0.4	3%	5.4	36%
	Total	**14.8**	**3.5**	**1.5**	**34%**	**0.4**	**3%**	**5.4**	**36%**
Coastal California gnatcatcher	Coastal scrub	0.6	0.4	0.0	60%	0.0	0%	0.4	60%
	Diegan coastal sage scrub: *Baccharis*-dominated	1.3	0.4	0.3	53%	0.0	0%	0.4	32%
	Total	**1.9**	**0.8**	**0.3**	**55%**	**0.0**	**0%**	**0.8**	**41%**

[1] Numbers may not sum exactly due to rounding.

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

One least Bell's vireo was observed during 2013 protocol surveys and another historical observation of vireo occurred outside of the project area (Figure 3.5-5). Both detections were within southern willow scrub habitat in the 500-foot buffer of the BSA. Southern willow flycatcher was not detected during 2013 surveys and is not known to occur within the BSA. Neither species has been documented to breed on-site although there is the potential that vireo breeding may occur as suitable southern willow scrub is present. Implementation of the Freshwater Alternative would directly impact 0.1 acre (3 percent) of the southern willow scrub riparian habitat within the study area as a result of staging within the vegetation drying areas (Table 3.5-5). Both least Bell's vireo and southwestern willow flycatcher are migratory birds. They may use the riparian scrub for foraging during summer months, but the short-term impact to 3 percent of the southern willow scrub riparian habitat is not substantial and would not result in a decline in the local population below self-sustaining levels (as a local population does not exist). **Therefore, temporary direct impacts to least Bell's vireo and southwestern willow flycatcher from the Freshwater Alternative would be less than significant (Criterion C).**

BELDING'S SAVANNAH SPARROW

Belding's savannah sparrow occupies southern coastal salt marsh nontidal habitat. Observations are particularly dense in the eastern portion of the I-5 Basin where pickleweed-dominated marsh habitat is prevalent. As a result of vegetation removal and grading/dredging and staging within the vegetation drying areas and staging areas, the Freshwater Alternative would temporarily impact 5.4 acres (36 percent) of southern coastal salt marsh nontidal habitat across the four basins (Table 3.5-5 and Figure 3.5-10).

Although Belding's savannah sparrows maintain territories, they do not often nest in the exact same location. In addition, the size of the territories and their boundaries are variable and change year to year based on environmental conditions, with expansion in dry years and contraction in wet years. It is anticipated that the resident birds would respond to the construction as they do to seasonal variability by shifting and contracting their territory size to accommodate the new acreage available.

Belding's savannah sparrow is a year-round resident and project construction would result in the temporary loss of less than 50 percent of their nesting habitat (southern coastal salt marsh nontidal). Direct impacts to this species include mortality of individuals. **Temporary direct impacts from the Freshwater Alternative on Belding's savannah sparrow would be significant due to the potential for mortality (Criteria C).**

COASTAL CALIFORNIA GNATCATCHER

One coastal California gnatcatcher has been historically observed (last observation in 1997) within the coastal sage scrub located within the 500-foot buffer of the BSA; this species was not detected during 2013 surveys. This species is not known to breed within the BSA. Implementation of the Freshwater Alternative would directly impact 0.4 acre (60 percent) of the coastal scrub habitat and 0.4 acre (32 percent) of Diegan coastal sage scrub: *Baccharis*-dominated at the eastern end of the BSA as a result of staging within the vegetation drying areas (Table 3.5-5). The species would likely use the site for foraging during summer months, but the short-term impact to 0.8 acre (41 percent) of suitable scrub habitats on-site is less than 50 percent of available habitat and would not result in a decline in the local population below self-sustaining levels (as a local population does not exist). Additionally, habitat within the vegetation drying areas would be restored to pre-construction conditions after project implementation. **Therefore, temporary direct impacts to coastal California gnatcatcher from the Freshwater Alternative would be less than significant (Criterion C).**

Short-term/Temporary Indirect Impacts

Indirect short-term/temporary impacts on sensitive species may include increases in exposure to predators as a result of nighttime lighting and construction-generated noise.

During construction, and as habitat becomes reestablished on-site, Belding's savannah sparrow and light-footed Ridgway's rail may be exposed to higher predation as they would be more concentrated in the remaining unimpacted habitat, much of which is located along the perimeter of the lagoon. Additionally, nighttime lighting in adjacent habitat would potentially increase predation by increasing visibility of sensitive species to predators. **Short-term/temporary indirect impacts to sensitive species resulting from concentrating species in unimpacted habitat and nighttime lighting would be considered significant (Criterion C).**

During construction, sensitive birds using the lagoon may be exposed to degraded water quality. Construction activities may increase turbidity and the presence of unconsolidated sediments, lowering visibility and making foraging more difficult. In addition, after the equipment ceases work in any given area, the material should reconsolidate within a short amount of time (hours if not days). Additionally, the disturbance of sediment would release sediment-dwelling organisms, potentially increasing foraging efficiency. The regulatory requirement to implement BMPs during construction would minimize impacts associated with turbidity and subsequent effects on foraging. **Short-term/temporary indirect impacts to sensitive species resulting from degraded water quality would be less than significant (Criterion C).**

The addition of construction noise to the lagoon environment has the potential to impact sensitive birds throughout the year. An increase in ambient noise levels could disrupt nesting and breeding behaviors that play an important role in the reproduction of wetland species such as the light-footed Ridgway's rail and Belding's savannah sparrow, and upland species such as the coastal California gnatcatcher (if present). In addition, elevated noise levels have the potential to affect bird foraging behavior during the nonbreeding season. As the loudest contiguous noise caused by construction, the dredge would be mobile in the lagoon and the potential for noise impact would travel with the machinery. In addition to dredging, other noise-generating equipment may be used during construction. It is unlikely that all of the equipment in the worst-case scenario would be used simultaneously or at the same location; however, this is the maximum equipment anticipated for this type of project and allows for a conservative estimate of impacts.

While birds within a substantial portion of the lagoon are already subject to elevated noise levels associated with the various transportation corridors, there is still a potential for construction noise to negatively impact breeding and foraging behavior. The movement of construction activities and the distribution and mobility of the wildlife make minimizing the impacts of noise with attenuating devices virtually impossible. **As such, noise impacts on sensitive birds are considered significant (Criteria C and D).**

In addition to noise generated by construction equipment, an increase in noise associated with vehicular traffic may also affect sensitive species. Although implementation of the proposed project would increase the frequency of vehicular traffic, birds nesting in this area are accustomed to vehicular traffic and, as such, are not expected to be substantially affected by a minor increase in traffic volume and the associated vehicular noise. **Noise impacts to birds from vehicular traffic are therefore considered less than significant (Criteria C and D)**.

Long-term/Permanent Direct Impacts

Direct permanent impacts on sensitive species include the active conversion of nesting and/or foraging habitat to another habitat type, modified lagoon conditions, and long-term maintenance and operation, including cattail maintenance.

As described above, suitable habitat for sensitive species would be changed and/or converted as a result of the proposed project. The direct permanent changes to suitable habitat for sensitive species are summarized in Table 3.5-6. This change may include a direct increase or decrease in the total acreage of a specific habitat type post-enhancement.

Table 3.5-6
Freshwater Alternative Existing and Post-Implementation Acreage of Suitable Habitat for Special-Status Wildlife Species (acres)[1]

Special-Status Species	Vegetation Community	Existing Habitat	Habitat Acreage Post-Implementation	Net Change in Habitat Acreage Post-Implementation
Light-footed Ridgway's rail	Coastal and valley freshwater marsh	96.2	24.7	-71.5
	Freshwater habitat transition zone	0.0	9.2	9.2
	Proposed cattail maintenance area[2]	0.0	312.9	312.9
	Transitional[2]	0.0	<0.01	<0.01
	Southern coastal salt marsh nontidal	14.8	14.8	0
	Total	**111.0**	**801.6**	**-289.4**
Western snowy plover	Beach	0.6	1.3	0.7
	Total	0.6	1.3	0.7
California least tern	Beach	0.6	1.3	0.7
	Open water	106.8	134.4	27.6
	Total	**107.4**	**135.7**	**28.3**
Least Bell's vireo and southwestern willow flycatcher	Southern willow scrub	2.2	2.2	0.0
	Total	**2.2**	**2.2**	**0.0**
Belding's savannah sparrow	~~Freshwater habitat transition zone~~	~~0.0~~	~~9.2~~	~~9.2~~
	Southern coastal salt marsh nontidal	14.8	14.8	0
	Total	**14.8**	**~~24.0~~14.8**	**~~9.2~~0**
Coastal California gnatcatcher	Coastal scrub	0.6	0.6	0.0
	Diegan coastal sage scrub	0.0	0.6	0.6
	Diegan coastal sage scrub: *Baccharis*-dominated	1.3	1.6	0.3
	Total	**1.9**	**2.8**	**0.9**

[1] Numbers may not sum exactly due to rounding.
[2] These habitat types would function biologically as coastal and valley freshwater marsh. One acre of channel within the cattail maintenance area has been removed as channels may be too deep to provide foraging opportunity.

Long-term monitoring and maintenance would be part of the Enhancement Project. This may include, but is not limited to, biological monitoring, nonnative species treatment, cattail maintenance, and other adaptive management strategies. Although each of these actions is intended to help the success of the enhancement effort, there is the potential for impacts to sensitive birds in the lagoon.

LIGHT-FOOTED RIDGWAY'S RAIL

Light-footed Ridgway's rail nesting and foraging habitat would be modified as a result of the Freshwater Alternative. Post-enhancement, the largest decrease in habitat type is coastal and

valley freshwater marsh (Table 3.5-6). Also, it should be noted that, post-implementation, the amount of southern coastal salt marsh nontidal would remain at 14.8 acres, which is the habitat that this species primarily relies on. Post-implementation of the Freshwater Alternative, habitat types are proposed that would be suitable to support light-footed Ridgway's rail, including the proposed cattail maintenance area (with the exception of the approximately 1 acre of channel) and transitional area, which would function biologically similar to coastal and valley freshwater marsh.

Although habitat acreage is important to consider when assessing project impacts, it is also important to consider the condition of the impacted habitat. The current and potential future southern coastal salt marsh nontidal and coastal and valley freshwater marsh habitat occupied by light-footed Ridgway's rail is denoted under existing conditions by the overall poor conditions of the lagoon resulting from poor tidal flushing and sediment accumulation. These less than optimal conditions would continue without implementation of the Freshwater Alternative. Thus, net benefit would occur to this species from implementation of the Freshwater Alternative. Altogether, there would be a net loss of nesting habitat acreage for light-footed Ridgway's rail by 2~~8~~9.4 acres, which equates to a loss of 26 percent when compared to existing conditions (Criterion A). **Thus, permanent direct impacts to Ridgway's rail would not be considered significant (Criteria A and C).**

In addition to affecting habitat acreage, the changes to lagoon hydrology under the Freshwater Alternative would also improve the condition of the remaining foraging and nesting habitat for light-footed Ridgway's rail, within and adjacent to the construction limits. Dredging the sediment load and removing vegetation mass would ultimately improve localized inter-basin water circulation in the lagoon. This is expected to enhance the benthic community in all foraging habitats. The improved conditions for nesting and foraging habitat outweigh the loss of habitat acreage. The net loss of nesting habitat is considered an impact; however, the reduction in nesting habitat would not substantially affect the sustainability of the Ridgway's rail population within the lagoon. Ultimately, the project is expected to benefit light-footed Ridgway's rail populations at Buena Vista Lagoon. **Therefore, permanent impacts to light-footed Ridgway's rail with implementation of the Freshwater Alternative are considered less than significant (Criterion C).**

The project would prepare an adaptive management, maintenance, and monitoring program that would include avoidance measures to minimize impacts to sensitive wildlife on-site, as described in Section 2.9. However, during cattail maintenance, there is potential for year-round mortality of birds. **As such, long-term maintenance activities would be considered significant (Criterion C).**

WESTERN SNOWY PLOVER

As a result of implementation of the proposed project, conversion of habitat would result in a net increase of beach habitat, with an increase from 0.6 acre of beach habitat, to 1.3 acres. This may be a potential benefit to this species, which is rarely observed foraging on the beach within the BSA. **As such, no significant or permanent impacts to western snowy plover would result from implementation of the Freshwater Alternative (Criterion C).**

CALIFORNIA LEAST TERN

California least tern is documented as annually foraging at Buena Vista Lagoon. Implementation of the Freshwater Alternative would permanently increase suitable nesting habitat for California least tern, increasing what is currently 107.4 acres of suitable habitat by 28.3 acres (Table 3.5-6). Also, the result of dredging accumulated sediment load may improve conditions for benthic species and fish species, as the improved circulation would enhance environmental conditions for the prey communities that this bird feeds on. The Freshwater Alternative would directly benefit species like California least tern that regularly use the lagoon for foraging, by increasing foraging habitat in both quantity and quality. **As such, no significant permanent impacts to California least tern would result with project implementation of the Freshwater Alternative (Criterion C).**

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

As a result of implementation of the proposed project, no conversion of habitat from the Freshwater Alternative would occur. Additionally, historical and/or recent locations of these species occur outside of the construction limits and neither of these migratory bird species is known to breed on-site. **As such, no significant permanent impacts to least Bell's vireo and southwestern willow flycatcher would result with implementation of the Freshwater Alternative (Criterion C).**

BELDING'S SAVANNAH SPARROW

Southern coastal salt marsh nontidal would not be converted to another habitat type as a result of the Freshwater Alternative (these areas would be left in place). ~~Additionally, freshwater habitat transition zone, a new habitat type suitable to support Belding's savannah sparrow, would be created (9.2 acres), from existing coastal and valley freshwater marsh vegetation.~~

The changes to lagoon hydrology would increase the condition of the remaining foraging and nesting habitat suitable for Belding's savannah sparrow. Improved hydrology would improve

overall circulation and flow, which would facilitate the drying of high-marsh habitat used for ground nesting. ~~In addition, creating a freshwater habitat transition zone would also improve overall habitat structure and diversity.~~ The improved conditions post-implementation of the Freshwater Alternative would ultimately benefit the Belding's savannah sparrow population at Buena Vista Lagoon and **permanent impacts are considered less than significant (Criterion C).**

COASTAL CALIFORNIA GNATCATCHER

Post-implementation of the Freshwater Alternative, there would be an increase of 0.3 acre of acreage of Diegan coastal sage scrub: *Baccharis*-dominated habitat, and a new habitat, Diegan coastal sage scrub (0.6 acre), suitable to support coastal California gnatcatcher (Table 3.5-6). **As such, no significant permanent impacts to coastal California gnatcatcher would result with project implementation (Criterion C).**

Long-term/Permanent Indirect Impacts

Indirect long-term/permanent impacts include the increased potential for invasive species, and changes to water quality, as well as impacts associated with cattail maintenance. As the Freshwater Alternative would result in habitat within the construction limits that would be similar to habitat immediately adjacent, transition to another habitat type is not anticipated.

It is possible that areas immediately adjacent to the construction limits may be more prone to invasion by nonnative species, particularly in staging areas adjacent to undeveloped upland habitat. As part of the post-implementation habitat monitoring and maintenance program for this project, the occurrence of these invasive species would be closely monitored. Future maintenance would regularly treat invasive species to limit the possibility of invasion. **Indirect impacts to sensitive species resulting from invasive species are not considered significant (Criterion C).**

Construction of the Boardwalk would encourage additional recreation at the lagoon. The Boardwalk would be constructed directly adjacent to Carlsbad Boulevard and, therefore, no substantial increase in noise is anticipated to result from recreational use. In addition, the Boardwalk would be built above the habitat, limiting potential for predation or harassment of sensitive species by domestic pets. Lastly, educational elements along with frequent placement of trash receptacles would minimize potential impacts associated with debris/littering. **Indirect impacts to sensitive species resulting from bridge construction are not considered significant (Criterion C).**

Cattail maintenance (post-enhancement) would occur during daylight hours and outside of the breeding season, as noted in Chapter 2 (PDF-11). Indirect impacts associated with long-term cattail maintenance due to nighttime lighting and noise would not occur. **Long-term/permanent indirect impacts to sensitive species resulting from nighttime lighting and noise would be considered less than significant (Criterion C).**

Special-Status Nonlisted Wildlife Species

A total of twenty-two nonfederally listed special-status wildlife species were detected within the BSA as summarized in Appendix E. Impacts to the 22 nonlisted resident wildlife species may include the direct loss of individuals as well as the short-term loss of habitat from grading/dredging and staging within the vegetation drying/staging areas. A few species may use habitats within the impact footprint, such as the wandering skipper, which is associated with salt marshes and is found in every lagoon in San Diego (Greer 2014). The project includes standard construction practices to minimize impacts to sensitive species, such as the presence of the Resident Engineer or designee to ensure that sensitive areas would be avoided. In addition, project impacts would be phased across the lagoon so that, at any given time, continued foraging and breeding habitat would be available to nonlisted wildlife species. Impacts to nonfederally listed wildlife species are not expected to result in the decline of any species below self-sustaining levels. However, potential impacts that may occur include mortality of individuals within the project footprint during the breeding season, and increased predation (as a result of nighttime lighting) and construction noise impacts to nonfederally listed special-status bird species within and adjacent to the project footprint. **Short-term direct and indirect impacts would be significant (Criterion C).**

Long-term direct and indirect impacts to nonfederally listed special-status species may also occur as a result of cattail maintenance activities. Maintenance would be scheduled outside the breeding season and during daytime hours, and the potential for mortality, noise impacts, and increased predation would be minimized. **Long-term direct and indirect impacts would be less than significant (Criterion C).**

Wildlife Corridors/Connectivity

The Freshwater Alternative would result in temporary and short-term impacts to wildlife movement throughout the lagoon during grading and dredging activities. However, construction would be phased and would occur within discrete locations at discrete timeframes within the lagoon basins, thereby allowing for wildlife movement within the BSA and adjacent habitat at any given time during construction.

No long-term impacts are anticipated. The project area would still function as a large area of natural open space that would allow for wildlife movement similar to existing conditions. **Therefore, no significant temporary or permanent impacts to wildlife movement/connectivity are anticipated with implementation of the Freshwater Alternative (Criterion D).**

Local Ordinances/Policies/Adopted Plans

The project would be required to be consistent with regional conservation plans. The North County MHCP covers the entire BSA, which includes the City of Oceanside HCP Subarea and Carlsbad HCP Subarea. Portions of the BSA are within conservation areas referred to as Hardline Focused Planning Areas within both subarea plans. The MHCP acknowledges the intent for enhancement of Buena Vista Lagoon (see Section 6.3.5 of the MHCP). Enhancement, maintenance, and monitoring plans prepared for the Freshwater Alternative would be prepared in accordance with the goals of the MHCP, draft Oceanside Subarea Plan, and final Carlsbad subarea plan, and in consultation with the wildlife agencies. The proposed project is also consistent with the goals and policies of the Carlsbad and Oceanside LCPs. The Oceanside LCP includes the following goals for Buena Vista Lagoon: "to protect and enhance the ecological and aesthetic values of the lagoon, including water quality, biological productivity and species diversity, and to provide opportunities for public access, recreation and educational use consistent with natural and aesthetic resource protection." Although the Carlsbad LCP does not establish specific goals for the lagoon, it prioritizes the protection of the lagoon as an environmentally sensitive habitat area. **Therefore, no significant impact would result with implementation of the Freshwater Alternative (Criterion E).**

Long-term Benefits

Some relatively modest benefits to biological resources would occur under the Freshwater Alternative. Although overall acreage suitable for threatened and endangered species nesting would decrease from existing conditions with the removal of vegetation (from 101.5 to 65.2 acres), the quality of remaining freshwater marsh would increase. Existing vegetation is dense and continues to encroach into open water areas of the lagoon. The Freshwater Alternative would retain some freshwater marsh but would include maintenance of areas that exceed approximately 150 feet wide. Maintenance would include the creation of channels into dense stands of marsh vegetation~~, which would enhance habitat quality for nesting birds such as Ridgway's rail~~. These channels would provide open water foraging opportunities as well as increase localized water quality and circulation through the freshwater marsh areas. In addition, this alternative would halt the conversion of the lagoon to a more monotypic freshwater marsh through removal of cattails and the reduction of accumulated sediment to a depth that would minimize continued

vegetation encroachment into the lagoon basins. Removal and management of freshwater marsh vegetation would increase open water habitat for freshwater fish, as would the creation of deep open water areas. These deeper open water areas would experience longer residence times than existing conditions, but could still provide additional habitat for fish, depending on water quality conditions. As described in Section 3.5.1 and in the Biological Resources Technical Report, Buena Vista Lagoon contains large amounts of suitable habitat for the western pond turtle. Implementation of the Freshwater Alternative could improve the available habitat for this special-status nonlisted species.

Saltwater Alternative

Sensitive Riparian and Natural Vegetation Communities

Temporary and permanent impacts would occur to vegetation communities as a result of implementing the proposed Saltwater Alternative. Short-term changes would result from vegetation removal within areas designated for vegetation drying and construction staging. Long-term permanent impacts would result from project construction and direct impacts from vegetation removal as a result of opening the lagoon to tidal flushing from the ocean, grading, dredging, and sediment excavation. Impacts to vegetation communities are detailed in Table 3.5-7. Potential impacts are described in further detail below.

Short-term/Temporary Direct Impacts

Implementation of the Saltwater Alternative would result in impacts to 75 percent of the project footprint. Approximately 179.2 acres of vegetation may be temporarily displaced during vegetation removal, sediment removal, and grading and dredging activities, as seen in Figure 3.5-11. The primary concern for temporary loss of habitat is reduced availability of food and shelter for resident and migratory species that rely on the lagoon. As shown in Table 3.5-7, construction would result in greater than 50 percent temporary loss of sensitive riparian habitat (coastal and valley freshwater marsh, open water vegetation types) and sensitive upland habitat (coastal scrub and Diegan coastal sage scrub: *Baccharis*-dominated). The temporary loss of these habitats may threaten local populations of sensitive resident species, as described further below.

Temporary, direct impacts to beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub: *Baccharis*-dominated are therefore considered significant (Criterion A)

Temporary impacts to riparian wetland vegetation communities such as nonnative riparian, southern coastal salt marsh nontidal, and southern willow scrub are not considered significant

because greater than 50 percent of the local habitat would remain available to local residents and migratory species during construction. Prior to construction, sensitive "no construction" zones would be identified and fenced or flagged to avoid impacts outside of the identified limits of disturbance, as described in Table 2-9, Standard Construction Practices. These areas would be monitored throughout construction by a qualified biologist. **Temporary direct impacts to nonnative riparian and southern coastal salt marsh nontidal, and southern willow scrub would be less than significant (Criterion A).**

Implementation of the Saltwater Alternative would also result in temporary impacts to vegetation types within vegetation drying areas and staging areas, primarily located on the outer perimeters of the Weir Basin, Railroad Basin, and I-5 Basin. Approximately 5.0 acres would be temporarily impacted at the proposed vegetation drying areas. Approximately 5.2 acres would be impacted within the proposed areas. It should be noted that these areas would be restored to pre-construction conditions, after project implementation.

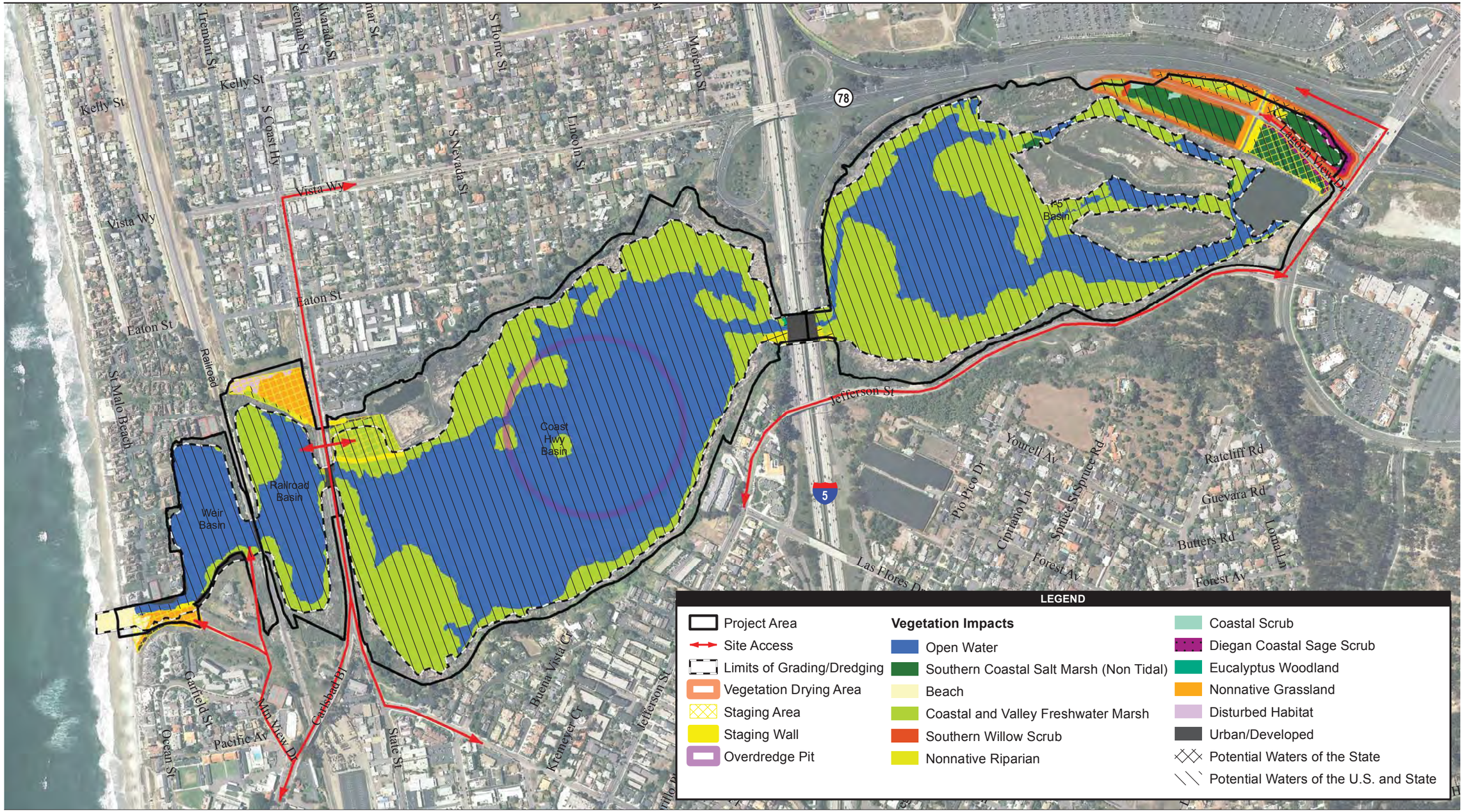
Short-term/Temporary Indirect Impacts

Short-term indirect impacts associated with the Freshwater Alternative, as shown in Figure 3.5-11, would be similar to the Saltwater Alternative. Implementation of BMPs, delineation of sensitive "no construction" zones, and construction monitoring would be incorporated into the project, and **short-term indirect impacts would be less than significant (Criteria A and B).**

Long-term/Permanent Direct Impacts

Long-term permanent impacts to vegetation communities as a result of implementation of the Saltwater Alternative consist of habitat conversion as a result of vegetation removal, sediment removal, and dredging. Vegetation proposed to replace existing vegetation communities as a result of habitat conversion for each alternative is provided in Table 3.5-4. Vegetation type-conversion would continue through time as a result of exposure to tidal flushing and influx of saltwater from the open channel.

Generally, the Saltwater Alternative would result in complete habitat conversion into saltwater-associated vegetation communities from coastal and valley freshwater marsh, influenced primarily by saltwater entering the lagoon from an open tidal inlet during flood tides, as well as freshwater entering the lagoon from upstream and along the boundary of the lagoon.



Source: Sangis 2014; SANDAG 2012; AECOM 2014; Everest 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-11
Saltwater Alternative Impacts to Vegetation Communities and Habitats

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Table 3.5-7
Temporary Direct Impacts to Vegetation Communities, Saltwater Alternative (acres)[1]

Vegetation Community	Grading/ Dredging	Vegetation Drying	Staging areas	Total	% Impacted in the Project Footprint
Riparian and Wetlands					
Beach	0.5	0.0	0.1	0.5	82%
Coastal and valley freshwater marsh	64.4	1.2	0.8	66.5	69%
Nonnative riparian	0.4	0.4	0.1	0.9	21%
Open water	100.8	0.0	0.0	100.8	94%
Southern willow scrub	0.0	0.1	0.0	0.1	4%
Southern coastal salt marsh nontidal	1.1	2.6	1.5	5.2	35%
Uplands					
Coastal scrub	0.0	0.4	0.0	0.4	60%
Diegan coastal sage scrub: *Baccharis*-dominated	0.1	0.3	0.3	0.7	53%
Eucalyptus woodland	0.0	0.0	0.0	0.0	7%
Nonnative grassland	0.4	0.0	1.9	2.2	93%
Other Cover Types					
Disturbed habitat	0.0	0.0	0.4	0.4	42%
Urban/developed	1.4	0.0	0.1	1.5	20%
Total	**169.1**	**5.0**	**5.2**	**179.2**	**75%**

[1] Numbers may not sum exactly due to rounding.

The Saltwater Alternative would feature a subtidal, open water channel running from the ocean (tidal inlet) to approximately halfway through the I-5 Basin. On either side of the channel, the ground would be graded to provide intertidal mudflat and a mix of coastal salt marsh habitats (low, mid, and high salt marsh) within each of the four basins.

As discussed further below, overall acreage of habitat available for special-status species would increase with this alternative, and benefits from improved hydrological function would be expected. There would be increased habitat available for special-status species not currently using the lagoon. **With improved lagoon ecology, increased foraging for species, and no overall loss of lagoon resources, direct impacts to sensitive vegetation communities with implementation of the Saltwater Alternative are considered less than significant (Criteria A and B).**

Long-term/Permanent Indirect Impacts

As a result of implementation of the Saltwater Alternative, saltwater would inundate freshwater marsh habitat adjacent to the limits of construction. As a result, these areas would be naturally

transitioned to salt marsh habitat types as cattails would die from saltwater exposure. Dead biomass would be removed and monitored to confirm the need for active supplemental planting. Approximately 97.3 acres of coastal valley and freshwater marsh habitat occurs within the project footprint; of this amount, approximately 66.5 acres would be directly impacted within the limits of construction. Thus, approximately 30.8 acres of coastal and valley freshwater marsh habitat may be converted to salt marsh habitat over time. Although coastal and valley freshwater habitat would be impacted, it would be replaced by a natural community type that would continue to provide habitat for special-status species. **Thus, permanent indirect impacts as a result of the Saltwater Alternative are considered less than significant (Criteria A and B).**

Jurisdictional Waters and Wetlands

Temporary and permanent impacts would occur to potential jurisdictional waters and wetlands as a result of implementing the Saltwater Alternative. Short-term changes would result from vegetation removal within the construction limits and areas designated for vegetation drying and construction staging. Long-term permanent impacts would result from project construction and direct impacts from vegetation removal as a result of tidal influence, grading, dredging, and sediment excavation. Impacts to potential jurisdictional waters and wetlands are detailed in Table 3.5-8. Potential impacts are described in further detail below.

Table 3.5-8
Temporary Direct Project Impacts to Potential Jurisdictional Wetlands and Waters, Saltwater Alternative (acres)[1]

Potential Jurisdictional Wetlands and Waters	Grading/ Dredging	Vegetation Drying	Staging areas	Total
Waters of the U.S.				
Wetland	65.6	3.9	2.4	71.8
Other Waters	100.8	0	0	100.8
Waters of the State				
Nonwetland riparian	0.5	0.4	0.05	0.92
Total	**166.8**	**4.3**	**2.4**	**173.5**

[1]Numbers may not sum exactly due to rounding.

Short-term/Temporary Direct Impacts

Of the approximately 224.2 acres of jurisdictional waters and wetlands, approximately 173.5 acres would be directly impacted by construction as a result of direct habitat removal (166.8 acres from grading/dredging, 4.3 acres from vegetation drying areas, and 2.4 acres from staging areas). Of this, approximately 0.9 acre is considered nonwetland riparian waters under the jurisdictional purview of CDFW, consisting of eucalyptus woodland and nonnative riparian habitat along the upper banks of the lagoon, and therefore considered associated riparian habitat of the lagoon. These areas do not support a dominance of hydrophytic vegetation and therefore

were determined not to be a three-parameter wetland. These impacts would include the short-term loss of vegetation as described above, and potential impacts to water quality associated with construction. As described in Section 3.4 Water Quality and Aquatic Sediment Quality, several project design features have been incorporated to minimize temporary impacts on water quality within the lagoon.

Due to the temporary nature of the direct impacts, overall project objective of improved wetland function and value, and with implementation of project design features and compliance with requirements for BMPs, **the short-term direct impacts resulting from the implementation of Saltwater Alternative are considered less than significant (Criteria A and B).**

Short-term/Temporary Indirect Impacts

Short-term indirect impacts to jurisdictional waters would include changes in habitat or water quality that may result from project implementation. Indirect impacts to vegetation would include construction-generated dust, sedimentation, and runoff into surrounding waters. However, implementation of BMPs, delineation of sensitive "no construction" zones, and construction monitoring would be incorporated into the project, and **short-term indirect impacts would be less than significant (Criteria A and B).**

Long-term/Permanent Direct Impacts

Prior to implementation of the Saltwater Alternative, approximately 224.2 acres of the 557-acre BSA was determined to be potential jurisdictional waters and wetlands of the U.S. and state. Following implementation of the Saltwater Alternative, conversion from one wetland type to another would occur due to dredging of channels/basins and improvements to hydrologic function. Implementation of the Saltwater Alternative would only result in habitat type-conversion and would not result in permanent loss of jurisdictional waters and wetlands of the U.S. and state.

The amounts of jurisdictional waters and wetlands are expected to be similar to existing conditions following implementation of the Saltwater Alternative. In addition, the Saltwater Alternative would create higher diversity of wetland communities by slowly transitioning from open water to high southern coastal salt marsh (tidal) throughout the lagoon thereby enhancing wetland conditions of jurisdictional waters and wetlands within the lagoon.

There would be an increase in open water, and habitat value and function is expected to increase relative to pre-enhancement conditions. **Therefore, no long-term significant indirect permanent impacts to jurisdictional waters and wetlands are anticipated with implementation of the Saltwater Alternative (Criterion B).**

Long-term/Permanent Indirect Impacts

Long-term indirect impacts to jurisdictional waters adjacent to the construction limits would potentially result in an improved saltwater system as a result of natural tidal flushing and increased circulation within the lagoon. **No significant permanent indirect impacts to wetlands are anticipated with enhancement (Criterion B).**

Fish Resources

Short-term/Temporary Direct and Indirect Impacts

Short-term indirect impacts associated with the Freshwater Alternative, as shown in Figure 3.5-11, would be similar to the Saltwater Alternative. Implementation of BMPs, delineation of sensitive "no construction" zones, and construction monitoring would be incorporated into the project, and **short-term indirect impacts would be less than significant (Criteria A and B).**

As described under the Freshwater Alternative, there are various short-term construction activities that would have the potential to cause direct impacts to fish populations in the lagoon. In-water construction could result in increased sediment and turbidity as well as sound waves and pressure, all of which can adversely affect and disrupt fish. **However, since no special-status fish species occur in the lagoon, temporary direct impacts resulting from the Saltwater ~~Freshwater~~ Alternative would not be considered significant (Criterion C).**

As described under the Freshwater Alternative, construction activities may cause adverse effects to foraging habitat, breeding habitat, or other areas necessary for reproduction by resident freshwater fish species; however, these impacts would be short-term, and fish can travel to less-affected portions of the lagoon. Thus, **the Saltwater ~~Freshwater~~ Alternative would not substantially interfere with the movement of any native resident or migratory fish or with established native resident or migratory wildlife corridors, or impedance in the use of native wildlife nursery sites (Criterion D).**

Long-term/Permanent Direct Impacts

Implementation of the Saltwater Alternative would have permanent, long-term impacts on the fish resources in Buena Vista Lagoon. Implementation of the Saltwater Alternative would extirpate nonnative freshwater fish species while promoting native saltwater fish species to enter and utilize Buena Vista Lagoon during various life history stages. The impact would be permanent and would apply to the entire lagoon, but is not significant as these are impacts to

nonnative fish. Impacts from enhancement activities to habitat availability and quality, and water quality would have long-term impacts on native fish, fish populations, species assemblage, and species diversity. Under the Saltwater Alternative, Buena Vista Lagoon would be converted from a freshwater system to a saltwater system by engineering an inlet that would allow saltwater inundation throughout the lagoon. There would be beneficial impacts on fish resources in Buena Vista Lagoon under the Saltwater Alternative including, but not limited to, creation and enhancement of habitat and enhanced water quality conditions for native marine species. Implementation of this alternative would have no impact on the two native species currently present in the lagoon, California killifish and striped mullet, because both species are euryhalic and capable of thriving in a variety of marine environments.

Anticipated salinity levels associated with the Saltwater Alternative would exceed the upper tolerance range of freshwater fish species currently present in the lagoon, which would affect species assemblages. Freshwater fish species (with the exception of California killifish and striped mullet) would be extirpated from the lagoon and replaced by saltwater guilds. Species assemblages, population structure, and species diversity are likely to change through time as a result of temporary changes to saltwater habitat complexity and composition (e.g., development of ~~kelp and~~ eelgrass beds) and primary production.

Enhancement activities affecting habitat quality and quantity under the Saltwater Alternative are similar to those described above under the permanent direct impacts section for the Freshwater Alternative: vegetation removal, dredging, and creation of deep water habitat. The difference between the two alternatives is the amount and types of habitat that would be created. Much of the lagoon would be dredged and graded to create tidal mudflats and allow salt marsh communities to develop through natural processes. Approximately 20 acres of mudflat and 124 acres of salt marsh, both habitat types tidally influenced, would be created. Open water habitat would be reduced by approximately 56 acres. Creation of mudflats and salt marsh would have long-term, beneficial impacts on saltwater fish species that may utilize the lagoon following implementation of the Saltwater Alternative. Loss of open water habitat would not impact saltwater fish species because a naturally functioning, healthy saltwater ecosystem would be created providing high-quality, suitable habitat and suitable hydrologic conditions. Creation of deep water habitat, approximately 4 acres, would have the same long-term, beneficial impacts on saltwater fish resources as described above under the permanent direct impacts section for the Freshwater Alternative.

Establishment of marine submergent vegetation is likely to occur at some point in time following saltwater inundation, which would provide spawning and nursery habitat for a variety of saltwater fish species and improve water quality. The overall effect on marine fish resources

from establishment of submergent vegetation would be an increase in available habitat types, improved water quality, and increased species diversity.

Hydrologic regimes under the Saltwater Alternative would maintain high water quality conditions throughout the lagoon that would be suitable for saltwater fish species. Engineering designs for the tidal inlet and graded elevations would allow tidal exchange, improve circulation, provide saltwater inundation, and maintain a frequency of flushing throughout to ensure high water quality. The anticipated magnitude of the tidal prism and the modeled water residence times through a range of conditions suggest frequent mixing would preclude stratification between saltwater and freshwater, a situation that could create an anoxic zone in the hypolimnion unsuitable for fish resources. Regular tidal exchange, frequent flushing, and good circulation would maintain a healthy, functional marine environment beneficial to saltwater fish species.

Under the Saltwater Alternative, conversion from a freshwater to marine fishery would evolve as tidal influence attracts saltwater species typical of southern California bays and lagoons. Thus, freshwater recreational angling opportunities would be eliminated under the Saltwater Alternative. However, conversion to a saltwater system may encourage saltwater fish species popular among recreational anglers to enter and utilize the lagoon. Comparable nearby lagoons with similar inlet configurations as the proposed Enhancement Project (under Saltwater and Hybrid Alternatives only) include Agua Hedionda and Batiquitos lagoons. Both comparable lagoons have inlet sizes ranging up to approximately 120 feet wide and the proposed Enhancement Project inlet would be 80 feet wide. As detailed in Section 3.1 Land Use/Recreation, RecFIN provides sample data for fisheries along the coast of California. Their records for Agua Hedionda lagoon indicate that for over 10 years saltwater species, including those popular to sport fishing such as sandbass, corbina, halibut, and seabass among other species have been present in the lagoon (RecFIN 2014). Batiquitos Lagoon was restored to a tidal lagoon in December 1996 after a new engineered inlet was opened. Prior to restoration, Batiquitos Lagoon was a brackish system that was supplemented with saltwater and marine species shortly before restoration to help facilitate the transition to regular tidal flow. Batiquitos Lagoon was sampled for fish as part of a 10-year post-restoration monitoring plan (Merkel & Associates 2009). Stock fish introduced into the lagoon were equipped with a magnetic tag and many of the larger fish collected during the 10-year monitoring plan did not have a magnetic tag, suggesting natural recruitment possibly attracted by the hatchery size fish. Results of the 10-year monitoring effort showed that species including spotted sand bass, kelp bass, croaker, white seabass, and surfperch established populations that grew throughout the study. These species showed increased density as the eelgrass beds expanded (Merkel & Associates 2009). In addition, CDFW staff familiar with the local lagoons confirmed that saltwater species, such as leopard sharks as well as sport fish such as halibut are known to be present within these similar lagoon systems (CDFW 2014d, e).

While the transition to saltwater under this alternative would cause a change in the fish species that may be supported within the lagoon, the change has the potential to significantly benefit native saltwater fish species. Implementation of this alternative would have no impact on the two native species currently present in the lagoon, California killifish and striped mullet, because both species are euryhalic and capable of thriving in a variety of marine environments. Implementation of this alternative would extirpate the nonnative fish species currently present in the lagoon; however, none of these species are listed. Implementation would result in a positive net effect on native fish resources. **Therefore, this change would not result in a significant biological resource impact to existing fish resources (Criterion D).**

Long-term/Permanent Indirect Impacts

Permanent indirect impacts resulting from implementation of the Saltwater Alternative include increased flushing and circulation, reduced rate of eutrophication, and an overall improvement to water quality. Post-project water quality would support a healthy, naturally functioning saltwater environment that would be beneficial to saltwater fish resources. **Thus, permanent indirect impacts as a result of the Saltwater Alternative would be considered less than significant (Criterion D).**

Special-Status Listed Flora

No federally listed or state-listed rare, threatened, or endangered plant species occur within the construction limits of the Saltwater Alternative. One special-status plant species, southwestern spiny rush (CNPS List 4.2), is known to occur in the I-5 Basin, within coastal and valley freshwater marsh habitat. Temporary direct impacts would occur to these plants, as they occur within the vegetation drying areas (Figure 3.5-12). The large population of southwestern spiny rush is expected to persist within the lagoon, as the majority of the salt marsh (mid and high) habitats would remain intact.

Temporary direct impacts to southwestern spiny rush in the form of vegetation removal and mortality of individuals within the vegetation drying areas and staging areas may occur. The regulatory requirement to implement BMPs would minimize indirect impacts to plants located adjacent to the construction limits (e.g., construction-generated dust, runoff, and sedimentation). **Therefore, significant temporary direct impacts to special-status plant populations are anticipated with implementation of the Saltwater Alternative (Criterion C).**

Special-Status Listed Fauna

Short-term/Temporary Direct Impacts

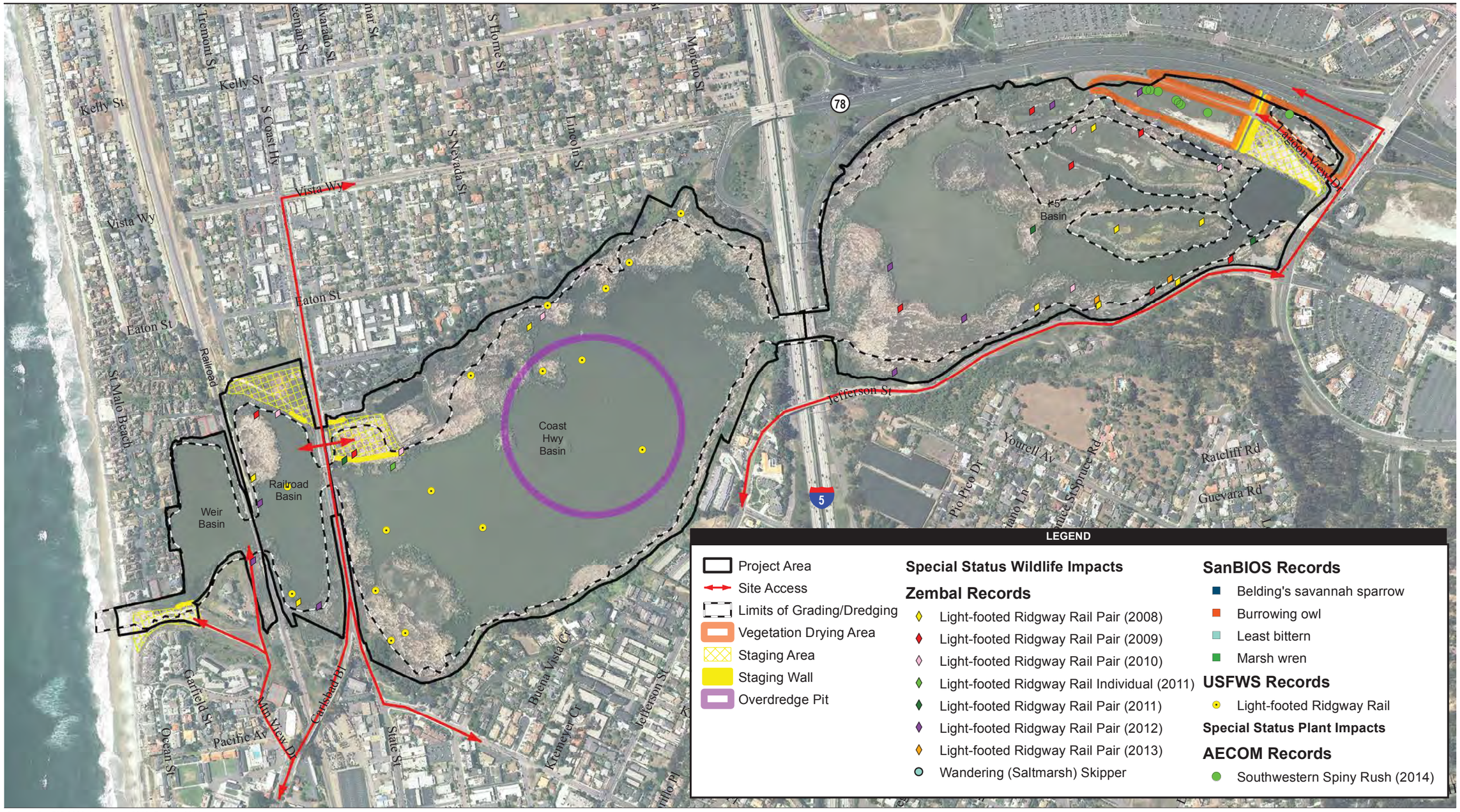
Impacts may include the short-term loss of nesting and/or foraging habitat for special-status wildlife species resulting from construction and maintenance activities. Of the 114 special-status wildlife species with the potential to occur within the BSA, seven species are federally and/or state listed. These are the light-footed Ridgway's rail, western snowy plover, California least tern, least Bell's vireo, southwestern willow flycatcher, Belding's savannah sparrow, and coastal California gnatcatcher. Impacts to special-status wildlife species habitat are provided in Table 3.5-9 and are separated into two types of short-term impacts: areas that occur within staging/vegetation drying areas and areas impacted by grading/dredging.

LIGHT-FOOTED RIDGWAY'S RAIL

Light-footed Ridgway's rail is a year-round resident in the lagoon, found in coastal and valley freshwater marsh and southern coastal salt marsh nontidal habitat. The Saltwater Alternative would directly impact 71.7 acres (65 percent) of existing suitable nesting habitat through direct grading/dredging and staging/vegetation drying (Table 3.5-9 and Figure 3.5-12). Impacts are associated with habitat removal for areas that occur within the grading/dredging and staging footprint, or habitat displacement within the vegetation drying areas. Additional impacts to this species include mortality of individuals, increased predations as a result of nighttime lighting within the construction footprint, and noise impacts during the breeding season. **As impacts to greater than 50 percent of the suitable habitat with would occur with implementation of the Saltwater Alternative, temporary direct impacts to light-footed Ridgway's rail are considered significant (Criterion C).**

WESTERN SNOWY PLOVER

The western snowy plover suitable habitat is limited to the beach habitat west of the weir; impacts to 0.5 acre (82 percent) of beach habitat for this species would occur during construction (Table 3.5-9). Western snowy plover does not forage frequently within the BSA and likely no longer breeds there as historical nesting sites within the BSA have been altered by anthropogenic factors. As mudflat habitats suitable for foraging do not occur within the BSA, plover is currently not likely to occur; thus, this species is not likely to be impacted. **Therefore, temporary direct impacts to western snowy plover from the Saltwater Alternative would be less than significant (Criterion C).**



Source: SanGIS 2009; Landiscorp 2010; Everest 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-12
Saltwater Alternative Impacts to Special Status Species

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Table 3.5-9
Temporary Direct Project Impacts to Special-Status Wildlife Species Habitat, Saltwater Alternative (acres)[1]

Special-Status Species	Vegetation Community	Existing Habitat	Habitat Impacted by Vegetation Drying/Staging			Habitat Impacted by Grading/Dredging		Total Direct Impact to Existing Habitat	
			Vegetation Drying	Staging areas	Percent	Grading/ Dredging	Percent	Total	Percent
Ridgway's rail	Coastal and valley freshwater marsh	96.2	1.22	0.83	2%	64.42	67%	66.48	69%
	Southern coastal salt marsh nontidal	14.78	2.57	1.52	28%	1.11	8%	5.2	35%
	Total	**110.98**	**3.79**	**2.35**	**6%**	**65.53**	**59%**	**71.68**	**65%**
Western snowy plover	Beach	0.6	0	0.05	8%	0.45	75%	0.49	82%
	Total	**0.6**	**0**	**0.05**	**8%**	**0.45**	**75%**	**0.49**	**82%**
California least tern	Beach	0.6	0	0.05	8%	0.37	62%	0.46	77%
	Open water	106.8	0	0.04	0%	100.79	94%	100.84	94%
	Total	**107.4**	**0**	**0.09**	**0%**	**101.16**	**94%**	**101.3**	**94%**
Least Bell's vireo and southwestern willow flycatcher	Southern willow scrub	2.2	0.07	0	3%	0.02	1%	0.09	4%
	Total	**2.2**	**0.07**	**0**	**3%**	**0.02**	**1%**	**0.09**	**4%**
Belding's savannah sparrow	Southern coastal salt marsh nontidal	14.78	2.57	1.52	28%	1.11	8%	5.2	35%
	Total	**14.78**	**2.57**	**1.52**	**28%**	**1.11**	**8%**	**5.2**	**35%**
Coastal California gnatcatcher	Coastal scrub	0.6	0.36	0	60%	0	0%	0.36	60%
	Diegan coastal sage scrub: *Baccharis*-dominated	1.3	0.33	0.28	47%	0.08	6%	0.69	53%
	Total	**1.9**	**0.69**	**0.28**	**51%**	**0**	**0%**	**1.05**	**55%**

[1] Numbers may not sum exactly due to rounding.

CALIFORNIA LEAST TERN

California least tern is documented as annually foraging at Buena Vista Lagoon but is not known to breed in the lagoon. Impacts to 0.5 acre (77 percent) of beach and 100.8 acres (94 percent) of open water would occur as a result of grading/dredging and staging/vegetation drying for the Saltwater Alternative (Table 3.5-9). Approximately 101.3 acres (94 percent) of California least tern foraging habitat would be impacted as a result of construction of the Saltwater Alternative. No suitable nesting habitat occurs within the lagoon.

Sediment mobilization, increased turbidity, and the resulting impaired water quality could affect fish, which is the primary food of California least tern. However, foraging species like the least tern are highly mobile and move throughout the lagoon as well as up and down the coast; as such, the temporary loss of their potential foraging habitat is not expected to have a significant impact on these species. In addition, many of these areas post-implementation are expected to return to the same/similar habitat type but with improved conditions as a result of improved hydrology. **Therefore, temporary direct impacts to California least tern from the Saltwater Alternative would be less than significant (Criterion C).**

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

One least Bell's vireo was observed during 2013 protocol surveys; another historical location of vireo occurs outside of the project area. Both observations are within southern willow scrub habitat in the 500-foot buffer of the BSA. Southern willow flycatcher was not detected during 2013 surveys and is not known to occur within the BSA. Neither species has been documented to breed on-site although there is the potential that vireo breeding may occur, as suitable southern willow scrub is present. Implementation of the Saltwater Alternative would directly impact 0.1 acre (4 percent) of the southern willow scrub riparian habitat within the lagoon as a result of staging within the vegetation drying areas and grading/dredging (Table 3.5-9). Temporary direct impacts are expected to be the same as the Freshwater Alternative. **Therefore, temporary direct impacts to least Bell's vireo and southwestern willow flycatcher from the Saltwater Alternative would be less than significant (Criterion C).**

BELDING'S SAVANNAH SPARROW

Belding's savannah sparrow occupies southern coastal salt marsh nontidal habitat. Observations are particularly dense in the eastern portion of the I-5 Basin where pickleweed-dominated marsh habitat is prevalent. As a result of vegetation removal and grading/dredging and staging within the vegetation drying areas and staging areas, the Saltwater Alternative would temporarily

impact 5.2 acres (35 percent) of southern coastal salt marsh nontidal habitat across the four basins (Table 3.5-9 and Figure 3.5-12).

The type of temporary direct impacts to Belding's savannah sparrow are expected to be the same as the Freshwater Alternative. **The Saltwater Alternative would have a significant temporary direct impact on Belding's savannah sparrow (Criterion C).**

COASTAL CALIFORNIA GNATCATCHER

Implementation of the Saltwater Alternative would directly impact 0.4 acre (60 percent) of coastal scrub habitat and 0.7 acre (53 percent) of Diegan coastal sage scrub: *Baccharis*-dominated at the eastern end of the BSA as a result of staging within the vegetation drying areas (Table 3.5-9). As vegetation would be removed outside of the breeding season and both species would likely use the site for foraging during summer months, the short-term impact to 1.1 acres (55 percent) of suitable scrub habitats on-site is greater than 50 percent. However, this would not be substantial and would not result in a decline in the local population below self-sustaining levels (as a local population does not exist). Additionally, habitat within the vegetation drying areas would be restored to pre-construction conditions after project implementation. **Therefore, temporary direct impacts to coastal California gnatcatcher from the Saltwater Alternative would be less than significant (Criterion C**).

Short-term/Temporary Indirect Impacts

Indirect short-term/temporary impacts on sensitive species may include increases in exposure to predators as a result of nighttime lighting. These impacts are identical to those described for the Freshwater Alternative. **Temporary indirect impacts to sensitive species from predation would be considered significant (Criterion C).**

Indirect noise impacts associated with the Saltwater Alternative would be similar to those described for the Freshwater Alternative. The construction (grading/dredging) footprint for the Saltwater Alternative is similar to the Freshwater Alternative. The overall construction approach is similar for both alternatives. **Similar to the Freshwater Alternative, short-term noise impacts on sensitive birds from construction would result in a significant impact (Criterion C).**

As with the Freshwater Alternative, noise from increased vehicular traffic associated with implementation of the Saltwater Alternative may also occur and would be similar. **Noise impacts to birds from vehicular traffic are therefore considered less than significant (Criterion C).**

Long-term/Permanent Direct Impacts

Direct permanent impacts on sensitive species include the active conversion of nesting and/or foraging habitat to another habitat type, modified lagoon conditions, and long-term maintenance and operation. As described above, suitable habitat for sensitive species would be changed and/or converted as a result of the proposed project. Many avian species can forage in either salt water or freshwater, but may not be able to breed at the lagoon, or would not remain a resident species, after lagoon habitat conversion. The direct permanent changes to suitable habitat for sensitive species are summarized in Table 3.5-10. This change may include a direct increase or decrease in the total acreage of a specific habitat type post-enhancement. Proposed special-status wildlife species habitat is provided in Table 3.5-10.

Long-term monitoring and maintenance would be part of the Enhancement Project. This may include, but is not limited to, biological monitoring, nonnative species treatment, and other adaptive management strategies. Although each of these actions is intended to help the success of the enhancement effort, there is the potential for impacts to sensitive birds in the lagoon.

LIGHT-FOOTED RIDGWAY'S RAIL

Light-footed Ridgway's rail nesting and foraging habitat would be increased as a result of the Saltwater Alternative. Post-enhancement, habitats would increase, with the doubling for southern coastal salt marsh tidal habitat and the creation of five new habitat types considered suitable for light-footed Ridgway's rail, including mudflats, and low/mid/high southern coastal salt marsh habitat (Table 3.5-10).

The existing southern coastal salt marsh nontidal and coastal and valley freshwater marsh habitat occupied by light-footed Ridgway's rail is limited under existing conditions by the overall poor conditions of the lagoon resulting from poor tidal flushing and sediment accumulation, and these less than optimal conditions would continue without implementation of the Saltwater Alternative. Light-footed Ridgway's rail observations have generally declined in the last 5 years (Zembal et al. 2013). This may correlate to the overall effect through time of the weir preventing the natural ocean-lagoon tidal processes. It is possible that, through opening of the channel and allowing for tidal influx, changes to lagoon hydrology under the Saltwater Alternative would also improve the condition of the foraging and nesting habitat for light-footed Ridgway's rail by providing habitat stratification, within and adjacent to the construction limits. It would be expected that the Ridgway's rail population would increase as the result of increased availability of optimal habitat. Ultimately, the project is expected to benefit light-footed Ridgway's rail populations at Buena Vista Lagoon. **Therefore, permanent impacts to light-footed Ridgway's**

rail with implementation of the Saltwater Alternative are considered less than significant (Criterion C).

Table 3.5-10
Saltwater Alternative Existing and Post-Implementation Acreage of Suitable Habitat for Special-Status Wildlife Species (acres)[1]

Special-Status Species	Vegetation Community	Existing Habitat	Habitat Acreage Post-Implementation	Net Change in Habitat Acreage Post-Implementation
Light-footed Ridgway's rail	Coastal and valley freshwater marsh	96.2	0	-96.2
	Mudflat	0.0	20	20.0
	Transitional	0.0	0	<0.01
	Southern coastal salt marsh nontidal	14.8	23.2	8.4
	Southern coastal salt marsh high	0.0	55	55.0
	Southern coastal salt marsh low	0.0	33.2	33.2
	Southern coastal salt marsh mid	0.0	35.4	35.4
	Total	111.0	166.8	55.8
Western snowy plover	Beach	0.6	0.8	0.2
	Mudflat	0.0	20	20.0
	Total	0.6	20.8	20.2
California least tern	Beach	0.6	0.8	0.2
	Open water	106.8	51	-55.8
	Deep open water	0.0	4	4.0
	Mudflat	0.0	20	20.0
	Total	107.4	75.8	-31.6
Least Bell's vireo and Southwestern willow flycatcher	Southern willow scrub	2.2	0	-2.2
	Total	2.2	0.0	-2.2
Belding's savannah sparrow	Mudflat	0.0	20	20.0
	Southern coastal salt marsh nontidal	14.8	23.2	8.4
	Southern coastal salt marsh high	0.0	55	55.0
	Southern coastal salt marsh low	0.0	33.2	33.2
	Southern coastal salt marsh mid	0.0	35.4	35.4
	Total	14.8	166.8	152.0
Coastal California gnatcatcher	Coastal scrub	0.6	0.5	-0.1
	Diegan coastal sage scrub	0.0	0.8	0.8
	Diegan coastal sage scrub: *Baccharis*-dominated	1.3	1.3	0.0
	Total	1.9	2.6	0.7

[1] Numbers may not sum exactly due to rounding.

To minimize impacts, the project would prepare an adaptive management, maintenance, and monitoring program that would include avoidance measures to minimize impacts to sensitive wildlife on-site. **As such, long-term monitoring and maintenance activities are not expected to have a substantial effect on any sensitive species, and permanent impacts from the Saltwater Alternative are considered less than significant (Criterion C).**

WESTERN SNOWY PLOVER

Western snowy plover nesting and foraging habitat would be increased as a result of the Saltwater Alternative. Post-enhancement, habitats would increase, with an increase of 0.6 acre to 0.8 acre of beach habitat (suitable for nesting and foraging), and creation of 20 acres of new mudflat habitat, suitable for foraging (Table 3.5-10). This species is currently not known to nest within the lagoon but is known to forage; thus, this increase in foraging habitat may be a potential benefit to this species. **As such, no significant or permanent impacts to western snowy plover would result from implementation of the Saltwater Alternative (Criterion C).**

CALIFORNIA LEAST TERN

California least tern is documented annually as foraging at Buena Vista Lagoon. Implementation of the Saltwater Alternative would permanently decrease suitable foraging habitat for California least tern, reducing what is currently 107.4 acres of suitable habitat by 31.6 acres (Table 3.5-10). Also, the result of open tidal influx, creation of mudflats, and dredging accumulated sediment load may improve conditions for benthic species and fish species, as the improved circulation and mudflat habitat type would enhance environmental conditions for the prey communities that this bird feeds on. The Saltwater Alternative would directly benefit species like tern that regularly use the lagoon for foraging, by adding diversity of foraging habitat in quality. **As such, no significant permanent impacts to California least tern would result with project implementation of the Saltwater Alternative (Criterion C).**

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

Suitable habitat for least Bell's vireo and southwestern willow flycatcher would not be present within the Saltwater Alternative, post-implementation (Table 3.5-10). However, historical and/or recent locations of these species occur outside of the construction limits and neither of these migratory bird species is known to breed on-site. **As such, no significant permanent impacts to least Bell's vireo and southwestern willow flycatcher would result with project implementation of the Saltwater Alternative (Criterion C).**

BELDING'S SAVANNAH SPARROW

Belding's savannah sparrow nesting and foraging habitat would be increased as a result of the Saltwater Alternative. Post-enhancement, habitats would, with the doubling for southern coastal salt marsh tidal habitat and the creation of five new habitat types considered suitable for

Belding's savannah sparrow, including mudflats, and low/mid/high southern coastal salt marsh habitat (Table 3.5-10).

In addition, the changes to lagoon hydrology would improve the condition of the remaining foraging and nesting habitat suitable for Belding's savannah sparrow. Under current conditions, the frequency and duration of soil saturation in marsh habitat are highly variable and often affected by late season rains and ponding. This results in large fluctuations in the Belding's savannah sparrow population and nesting success each year, as this species can only nest on dry soil. It is possible that, through opening of the channel and allowing for tidal influx, changes to lagoon hydrology under the Saltwater Alternative would also improve the condition of the foraging and nesting habitat for Belding's savannah sparrow by providing habitat stratification, within and adjacent to the construction limits. Improved hydrology would overall improve circulation and flow, which would facilitate the drying of high-marsh habitat used for ground nesting. **The improved conditions post-implementation of the Saltwater Alternative would ultimately benefit the Belding's savannah sparrow population at Buena Vista Lagoon and permanent impacts are considered less than significant (Criterion C).**

COASTAL CALIFORNIA GNATCATCHER

Post-implementation of the Saltwater Alternative, there would be an increase of 0.7 acre of suitable habitat, including a new habitat, Diegan coastal sage scrub (0.8 acre), suitable to support coastal California gnatcatcher (Table 3.5-10). **As such, no significant permanent impacts to coastal California gnatcatcher would result with project implementation (Criterion C).**

Long-term/Permanent Indirect Impacts

Indirect long-term/permanent impacts include the passive transition of nesting and/or foraging habitat to another habitat type, increased potential for invasive species, and changes to water quality.

Coastal and valley freshwater marsh habitat outside of the construction limits for the Saltwater Alternative may passively transition (change) over a long period of time. Although the change in habitat is unpredictable in the transitional area, the connection to tidal hydrology and the improved circulation are expected to ultimately enhance the condition of the existing habitat within each of the four basins as saltwater marsh habitat is the preferred habitat for light-footed Ridgway's rail and Belding's savannah sparrow. Indirect impacts to sensitive species resulting from changes to the new transitional area are less than significant (Criterion C).

It is possible that reduced periods of saturation and increased salinity may make transitional areas more prone to invasion by nonnative species. As part of the post-implementation habitat monitoring and maintenance program for this project, the occurrence of these invasive species would be closely monitored and maintenance would regularly conduct treatments to limit the possibility of invasion. Indirect impacts to sensitive species resulting from invasive species are not considered substantial.

As described for the Freshwater Alternative, indirect changes to lagoon condition are expected as a result of the Saltwater Alternative and the corresponding improvement to tidal hydrology (i.e., circulation, turnover, etc.). The indirect improvement to water quality would benefit sensitive species.

With implementation of project design features and the net benefits of the Enhancement Project, indirect permanent impacts to sensitive species from passive transition of nesting and/or foraging habitat and invasive species are considered less than significant for the Saltwater Alternative (Criterion C).

Special-Status Nonlisted Wildlife Species

Impacts to nonlisted special-status wildlife species associated with the implementation of the Saltwater Alternative would be the same as the Freshwater Alternative as the extent of grading/dredging is similar. Short-term direct and indirect impacts to migratory and nonresident wildlife species would occur due to mortality, increased risk of predation, and noise. **Short-term direct and indirect impacts would be significant (Criterion C).**

Wildlife Corridors/Connectivity

The Saltwater Alternative would have similar temporary and short-term impacts to wildlife corridors and connectivity as discussed for the Freshwater Alternative. **Therefore, no significant short-term or long-term impacts to wildlife movements or connectivity are anticipated with implementation of the Saltwater Alternative (Criterion D).**

Local Ordinances/Policies/Adopted Plans

Similar to the Freshwater Alternative, all restoration, maintenance, and monitoring plans prepared for the Saltwater Alternative would be prepared in accordance with the goals of these regional conservation plans, and in consultation with the wildlife agencies. As described under the Freshwater Alternative, the project is consistent with the goals and objectives of the MHCP, draft Oceanside Subarea Plan, final Carlsbad subarea plan, Carlsbad Habitat Management Plan,

and the LCPs of both cities. **Therefore, no significant impact would result with implementation of the Saltwater Alternative (Criterion E).**

Long-term Benefits

The Saltwater Alternative would result in substantial benefits to biological resources, including providing high-quality nesting habitat to threatened and endangered species (increasing area from 101.5 to 163 acres compared to existing conditions). This alternative would halt the conversion of the lagoon to a more monotypic freshwater marsh habitat with decreased circulation and open water that is currently occurring due to sedimentation and vegetation encroachment. The Saltwater Alternative would remove the highest amount of cattail and bulrush encroachment currently impeding water circulation and restricting fish habitat, and would transition remaining freshwater marsh areas to salt marsh over time. Increased circulation and flushing would result in a healthier benthic community and more foraging opportunities for birds. The foraging opportunities would be increased in quantity, quality, and diversity resulting in a long-term and persisting benefit for avian populations, including some special-status species. Transitioning the lagoon to a saltwater system would benefit native saltwater fish species that would have access to the lagoon system through the open inlet. Fish would also benefit from the creation of deep water habitat areas through improved spawning and rearing habitat, resulting in long-term beneficial effects on the stability and sustainability of fish populations.

Hybrid Alternative

Sensitive Riparian and Natural Vegetation Communities

Temporary and permanent impacts would occur to vegetation communities as a result of implementing the proposed Hybrid Alternative (Options A and B). Short-term changes would result from vegetation removal within areas designated for vegetation drying and construction staging. Long-term permanent impacts would result from project construction and direct impacts from vegetation removal as a result of opening the lagoon to tidal flushing from the ocean, grading, dredging, and sediment excavation. Impacts to vegetation communities are detailed in Table 3.5-11. Potential impacts are described in further detail below.

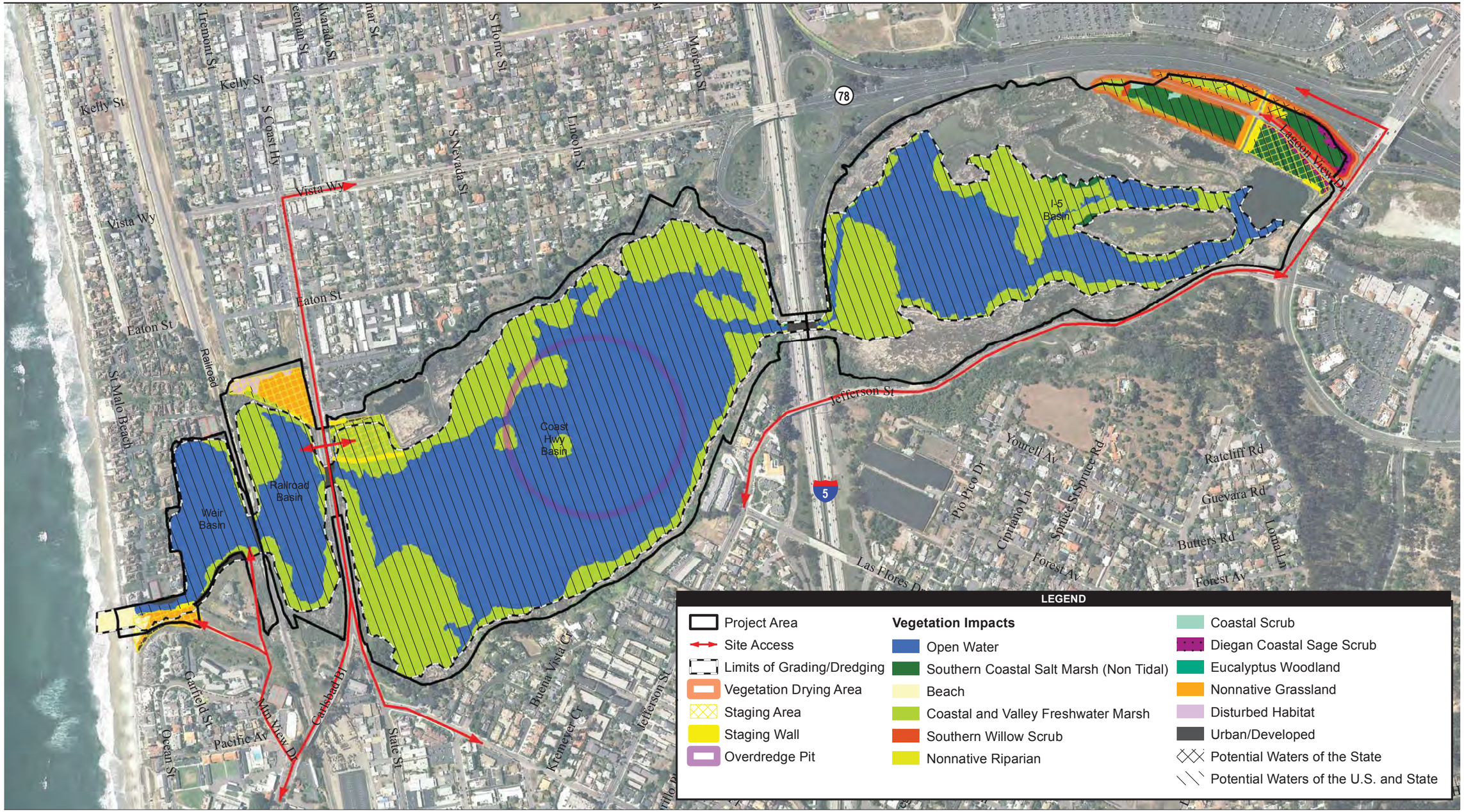
Table 3.5-11
Temporary Direct Impacts to Vegetation Communities,
Hybrid Alternative (Options A and B) (acres)[1]

Vegetation Community	Grading/ Dredging	Vegetation Drying	Staging areas	Total Impacts	% Impacted in the Project Footprint
Riparian and Wetlands					
Beach	0.5	0	0.1	0.1	83%
Coastal and valley freshwater marsh	55.2	1.2	0.6	57.0	59%
Nonnative riparian	0.1	0.5	0.1	0.6	15%
Open water	100.1	0	0.1	100.1	94%
Southern coastal salt marsh nontidal	0.4	3.5	1.5	5.4	36%
Uplands					
Coastal scrub	0	0.4	0	0.4	60%
Diegan coastal sage scrub: *Baccharis*-dominated	0	0.4	0.3	0.7	53%
Eucalyptus Woodland	0.01	0	0	0.01	2%
Nonnative grassland	0.4	0	1.8	2.3	94%
Southern willow scrub	0	0.1	0	0.1	3%
Other Cover Types					
Disturbed habitat	0	0	0.4	0.4	59%
Urban/developed	0.9	0.01	0.1	1.1	14%
Total	**157.4**	**6.1**	**5.0**	**168.5**	**71%**

[1] Numbers may not sum exactly due to rounding.

Short-term/Temporary Direct Impacts

Implementation of the Hybrid Alternative (Options A and B) would result in impacts to 71 percent of the project footprint (Table 3.5-11**)**. Approximately 168.5 acres of vegetation may be temporarily displaced during vegetation removal, sediment removal, and grading and dredging activities, as seen in Figure 3.5-13. The primary concern for temporary loss of habitat is reduced availability of food and shelter for resident and migratory species that rely on the lagoon. Temporary impacts are considered significant if more than 50 percent of sensitive habitat within the lagoon would be lost temporarily. As shown in Table 3.5-11, construction would result in greater than 50 percent temporary loss of sensitive riparian habitat (coastal and valley freshwater marsh, open water vegetation types) and sensitive upland habitat (coastal scrub and Diegan coastal sage scrub: *Baccharis*-dominated). The temporary loss of these habitats may threaten local populations of sensitive resident species, as described further below. **Temporary, direct impacts to beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub: *Baccharis*-dominated are therefore considered significant (Criterion A).**



Source: Sangis 2014; SANDAG 2012; AECOM 2014; Everest 2014

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Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-13
Hybrid Alternative Options A&B Impacts to Vegetation Communities and Habitats

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Temporary impacts to riparian wetland vegetation communities such as nonnative riparian, southern coastal salt marsh nontidal, and southern willow scrub are not considered significant because greater than 50 percent of the local habitat would remain available to local residents and migratory species during construction. Prior to construction, sensitive "no construction" zones would be identified and fenced or flagged to avoid impacts outside of the identified limits of disturbance, as described in Table 2-9, Standard Construction Practices. These areas would be monitored throughout construction by a qualified biologist. **Temporary direct impacts to nonnative riparian and southern coastal salt marsh nontidal and to southern willow scrub are therefore considered less than significant (Criterion B).**

Implementation of the Hybrid Alternative (Options A and B) would also result in temporary impacts to vegetation types within vegetation drying areas and staging areas, primarily located on the outer perimeters of the Weir Basin, Railroad Basin, and I-5 Basin (Figure 3.5-13). Vegetation would initially be cut and moved to the staging area specific to each basin. Areas with sufficient room (e.g., Coast Highway Basin and I-5 Basin) would be used as vegetation drying areas, and vegetation mass removed from the construction limits would be laid on the ground and/or picked up with slotted/holed picks/scoops to facilitate draining and/or drying of the vegetation and associated root mass. At these vegetation drying areas and at staging areas, existing vegetation would be crushed and/or removed, and the ground would be compacted. Approximately 6.1 acres would be temporarily impacted at the proposed vegetation drying locations. Approximately 5.0 acres would be impacted within the proposed staging areas. It should be noted that these areas would be restored to pre-construction conditions, after project implementation.

Short-term/Temporary Indirect Impacts

Temporary indirect impacts associated with the Hybrid Alternative (Options A and B) would be similar to the Freshwater and Saltwater Alternatives. **Short-term indirect impacts to vegetation communities would be less than significant (Criteria A and B). No significant indirect impacts to vegetation communities would result with project implementation (Criterion A).**

Long-term/Permanent Direct Impacts

Long-term permanent impacts to vegetation communities as a result of implementation of the Hybrid Alternative (Options A and B) consist of habitat conversion as a result of vegetation removal, sediment removal, and dredging. Vegetation proposed to replace existing vegetation communities as a result of habitat conversion for each alternative is provided in Table 3.5-4. Vegetation type-conversion would continue through time as a result of exposure to tidal flushing and influx of saltwater from the open channel west of I-5.

Generally, the Hybrid Alternative (Options A and B) would result in complete habitat conversion into saltwater-associated vegetation communities from coastal and valley freshwater marsh west of I-5, influenced primarily by saltwater entering the lagoon from an open tidal inlet during flood tides. Water exiting the lagoon under the Hybrid Alternative (Options A and B) west of I-5 would primarily occur during ebb tides (outgoing tides), with evapotranspiration and seepage providing additional output. East of I-5, the lagoon would remain a coastal and valley freshwater marsh system, with dredging/grading and sediment removal proposed to improve water circulation and sediment accumulation.

The Hybrid Alternative (Options A and B) would feature a subtidal, open water channel running from the ocean (tidal inlet) up to I-5. On either side of the channel west of I-5, the ground would be graded to provide intertidal mudflat and a mix of coastal salt marsh habitats (low, mid, and high salt marsh) within the three basins west of I-5. East of I-5, the coastal and valley freshwater marsh system would be similar to current conditions.

As discussed further below, overall acreage of habitat available for special-status species would increase with this alternative, and benefits from improved hydrological function are expected. There would be increased habitat available for special-status species not currently using the lagoon. **With improved lagoon ecology, increased foraging for species, and no overall loss of lagoon resources, direct impacts to sensitive vegetation communities with implementation of the Hybrid Alternative are considered less than significant (Criterion A).**

Long-term/Permanent Indirect Impacts

As a result of implementation of the Hybrid Alternative (Options A and B), saltwater would inundate freshwater marsh habitat adjacent to the limits of construction west of I-5. As a result, these areas would be naturally transitioned to salt marsh habitat types as cattails would die from saltwater exposure. Dead biomass would be removed and monitored to confirm the need for active supplemental planting. Thus, coastal and valley freshwater marsh habitat immediately adjacent to the construction limits would be converted to salt marsh habitat types, which are suitable to support special-status species. Although coastal and valley freshwater habitat would be impacted, it would be replaced by a natural community type that would continue to provide habitat for special-status species. Also, east of I-5, habitat conversion outside of the limits of construction would not occur and vegetation would remain a freshwater system. **Thus, permanent indirect impacts as a result of the Hybrid Alternative are considered less than significant (Criterion A).**

Jurisdictional Waters and Wetlands

Temporary and permanent impacts would occur to potential jurisdictional waters and wetlands as a result of implementing the Hybrid Alternative (Options A and B). Temporary changes would result from vegetation removal within the construction limits and areas designated for vegetation drying and construction staging. Permanent impacts would result from project construction and direct impacts from vegetation removal as a result of tidal influence, grading, dredging, and sediment excavation. Impacts to potential jurisdictional waters and wetlands are detailed in Table 3.5-12. Potential impacts are described in further detail below.

Table 3.5-12
Temporary Direct Project Impacts to Potential Jurisdictional Wetlands and Waters, Hybrid Alternative (Options A and B) (acres)[1]

Potential Jurisdictional Wetlands and Waters	Grading/ Dredging	Vegetation Drying	Staging areas	Total
Waters of the U.S.				
Wetland	55.5	4.8	2.2	62.5
Other waters	100.1	0	0.1	100.1
Waters of the State				
Nonwetland riparian	0.1	0.5	0.1	0.6
Total	**155.7**	**5.3**	**2.3**	**163.2**

[1] Numbers may not sum exactly due to rounding.

Short-term/Temporary Direct Impacts

The short-term temporary impacts resulting from the implementation of the Hybrid Alternative (Options A and B) would be similar to those discussed for the Freshwater Alternative and Saltwater Alternative. Of the approximately 224.2 acres of potential jurisdictional waters and wetlands, approximately 163.2 acres would be directly impacted by construction (155.8 acres from grading/dredging, 5.3 acres from vegetation drying areas, and 2.3 acres from staging areas). Of this, approximately 0.6 acre is considered state-only waters under the jurisdictional purview of CDFW.

The amounts of jurisdictional waters and wetlands are expected to be similar to existing conditions following implementation of the Hybrid Alternative (Options A and B). In addition, the Hybrid Alternative (Options A and B) would create higher diversity of wetland communities within the downstream portion of the lagoon (downstream of I-5) by slowly transitioning from open water to high southern coastal salt marsh (tidal) while extending open water areas within the upstream portion, thereby enhancing wetland conditions of jurisdictional waters and wetlands within the lagoon. **The short-term and long-term (direct and indirect) impacts resulting from the implementation of the Hybrid Alternative would be similar to those discussed for**

the Freshwater Alterative and Saltwater Alternative and are considered less than significant (Criterion B).

Short-term/Temporary Indirect Impacts

Temporary indirect impacts to jurisdictional waters for the Hybrid Alternative (Options A and B) would be the same as the Freshwater and Saltwater Alternatives and are considered less than significant (Criterion B).

Long-term/Permanent Direct Impacts

Prior to implementation of the Hybrid Alternative (Options A and B), approximately 224.2 acres of the 557-acre BSA was determined to be potential jurisdictional waters and wetlands of the U.S. and state. Following implementation of the Hybrid Alternative (Options A and B), conversion from one wetland type to another would occur due to dredging of channels/basins and improvements to hydrologic function. Implementation of the Hybrid Alternative (Options A and B) would only result in habitat type conversion and would not result in permanent loss of jurisdictional waters and wetlands of the U.S. and state. **Therefore, no long-term significant indirect permanent impacts to jurisdictional waters and wetlands are anticipated with implementation of the Hybrid Alternative (Options A and B) (Criterion B).**

Long-term/Permanent Indirect Impacts

Long-term indirect impacts to jurisdictional waters adjacent to the construction limits would potentially result in an improved saltwater system, as a result of natural tidal flushing and increased circulation within the lagoon. **No significant permanent indirect impacts to wetlands are anticipated with enhancement (Criterion B).**

Fish Resources

Short-term/Temporary Direct and Indirect Impacts

Temporary direct and indirect impacts to fish resources would be similar to the Freshwater and Saltwater Alternatives. **Temporary direct and indirect impacts to fish resources as a result of the Hybrid Alternative would not be considered significant (Criterion D).**

Long-term/Permanent Direct Impacts

Implementation of the Hybrid Alternative (Options A and B) would have permanent, long-term impacts on the fish resources in Buena Vista Lagoon. Under the Hybrid Alternative (Options A and B), a saltwater system would be created west of I-5 and the freshwater system east of I-5 would be maintained. Impacts from enhancement activities on habitat availability and quality, and water quality would have long-term impacts on fish, fish populations, species assemblage, and species diversity.

The differences between Option A and Option B are not significant enough to have different impacts on fish resources; both options would have similar impacts. Therefore, this discussion of the impacts associated with implementation of the Hybrid Alternative applies to both options.

Anticipated salinity levels associated with the Hybrid Alternative would exceed the upper tolerance range of freshwater fish species in the three basins west of I-5 (i.e., Coast Highway Basin, Railroad Basin, and Weir Basin) and would affect species assemblages. Freshwater fish species would be extirpated from these basins and replaced by saltwater guilds. Two native fish species, California killifish and striped mullet, are euryhalic and can be found in both saltwater and freshwater habitats (Moyle 2002). These species could continue to populate a saltwater lagoon system. Conversion to a saltwater system would encourage saltwater fish species to enter and utilize these basins during various life history stages. The saltwater environment could provide fertile rearing habitat, and possibly spawning habitat, for a variety of saltwater fish species, including members of the Atherinidae (silversides), Engraulidae (anchovies), Gobiidae (gobies), Embiotocidae (surfperch), and Clupeidae (herring, sardine) families. Fish species diversity is likely to increase in the lagoon following establishment of a saltwater environment, including associated habitat, and based on results from the Batiquitos Lagoon Restoration Project (Merkel & Associates 2009). Additionally, as described under the Saltwater Alternative, similar conditions recorded at Agua Hedionda Lagoon by RecFIN indicate that for over 10 years, saltwater species, including those popular to sport fishing such as sandbass, corbina, halibut, and seabass among other species have been present in the lagoon (RecFin 2014). Species assemblages, population structure, and species diversity are likely to change through time as a result of temporary changes to saltwater habitat complexity and composition (e.g., development of ~~kelp and~~ eelgrass beds) and primary production. Freshwater fish species assemblages in the I-5 Basin east of I-5 would not be affected by implementation of the Hybrid Alternative.

Enhancement activities affecting habitat quality and quantity under the Hybrid Alternative are similar to those described above under the permanent direct impacts section for the Freshwater Alternative and the Saltwater Alternative: vegetation removal, dredging, and creation of deep water habitat. The differences among alternatives are the amount and type of habitat that would

be created. Large areas in the basins west of I-5 would be dredged and graded to create tidal mudflats and allow salt marsh communities to develop through natural processes. Approximately 5 acres of mudflat and 68 acres of salt marsh, both habitat types tidally influenced, would be created. Open water habitat throughout the lagoon would be reduced by approximately 40 acres. Creation of mudflats and salt marsh would have long-term, beneficial impacts on saltwater fish species that may utilize the lagoon following implementation of the Hybrid Alternative. Loss of open water habitat would not impact saltwater or freshwater fish species because a naturally functioning, healthy ecosystem would be created providing high-quality, suitable habitat and suitable hydrologic conditions. Creation of deep water habitat in the lagoon, approximately 5 acres, would have the same long-term, beneficial impacts on fish resources as described above under the permanent direct impacts section for the other alternatives. Impacts on habitat quality and quantity under the Hybrid Alternative in the I-5 Basin would be similar to those described under the Freshwater Alternative. Habitat quantity and quality would increase and there would be a long-term, beneficial effect on freshwater fish resources.

Establishment of marine submergent vegetation is likely to occur at some point in time following saltwater inundation of the three basins west of I-5. Submergent vegetation such as ~~kelp and~~ eelgrass provide spawning and nursery habitat for a variety of saltwater fish species and improve water quality. In addition, establishment of submergent vegetation may attract fish species other than those listed above. The overall effect on marine fish resources from establishment of submergent vegetation would be an increase in available habitat types, improved water quality, and increased species diversity.

Hydrologic regimes under the Hybrid Alternative would maintain high water quality conditions throughout the lagoon that would be suitable for saltwater and freshwater fish species. A discussion of impacts is provided above in the Freshwater Alternative and Saltwater Alternative sections.

While the transition to saltwater under this alternative would cause a change in the fish species that may be supported within three basins, the change has the potential to significantly benefit saltwater fish species. Although there would be impacts to native and nonnative fish resources currently in the lagoon, no special-status saltwater fish species are known to occur in the lagoon. **Therefore, impacts to special-status fish species from implementation of the Hybrid Alternative would be less than significant (Criterion D).**

Long-term/Permanent Indirect Impacts

Permanent indirect impacts to fish resources would be similar to the Freshwater and Saltwater Alternatives for the respective basins. Long-term impacts resulting from implementation of the

Hybrid Alternative (Options A and B) would be beneficial to fish resources. **Therefore, permanent indirect impacts as a result of the Hybrid Alternative would be considered less than significant (Criterion D).**

Special-Status Listed Flora

No federally listed or state-listed rare, threatened, or endangered plant species occur within the construction limits of the Hybrid Alternative (Options A and B). One special-status plant species, southwestern spiny rush (CNPS List 4.2), is known to occur within the I-5 Basin, within coastal and valley freshwater marsh habitat. Temporary direct impacts would occur to these plants, as they occur within the vegetation drying areas (Figure 3.5-14). The regulatory requirement to implement BMPs would minimize indirect impacts to plants located adjacent to the construction limits (e.g., construction-generated dust, runoff, and sedimentation). **Significant temporary direct impacts to special-status plant populations are anticipated with implementation of the Hybrid Alternative (Criterion C).**

Special-Status Listed Fauna

Impacts may include the short-term loss of nesting and/or foraging habitat for special-status wildlife species resulting from enhancement activities. Of the 30 special-status wildlife species with the potential to occur within the BSA, seven species are federally and/or state listed. These include the light-footed Ridgway's rail, western snowy plover, California least tern, least Bell's vireo, southwestern willow flycatcher, Belding's savannah sparrow, and coastal California gnatcatcher. Impacts to special-status wildlife species habitat are provided in Table 3.5-13 and are separated into two types of short-term impacts: areas that occur within staging/vegetation drying areas and areas impacted by grading/dredging.

Short-term/Temporary Direct Impacts

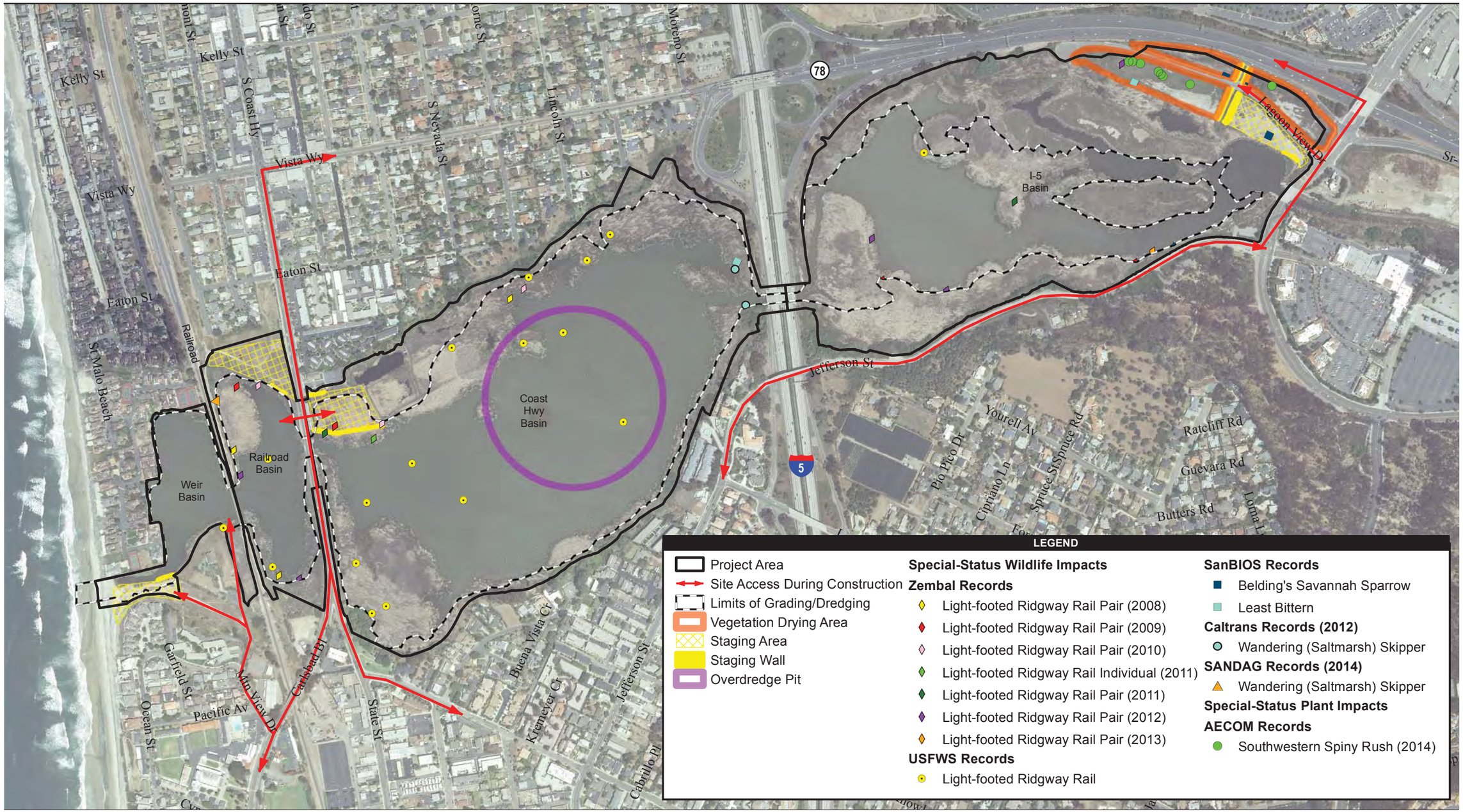
LIGHT-FOOTED RIDGWAY'S RAIL

Light-footed Ridgway's rail is a year-round resident in the lagoon, found in coastal and valley freshwater marsh and southern coastal salt marsh nontidal habitat. The Hybrid Alternative (Options A and B) is considered significant and would directly impact 62.4 acres (56 percent) of existing suitable nesting habitat through direct grading/dredging and staging/vegetation drying (Table 3.5-13 and Figure 3.5-14). The types of direct temporary impacts would be the same for the Hybrid Alternative as the Saltwater Alternative and Freshwater Alternative.

Table 3.5-13
Temporary Direct Project Impacts to Special-Status Wildlife Species Habitat, Hybrid Alternative (Options A and B) (acres)[1]

Special-Status Species	Vegetation Community	Existing Habitat	Habitat Impacted by Vegetation Drying/Staging			Habitat Impacted by Grading/ Dredging		Total Direct Impact to Existing Habitat	
			Vegetation Drying	Staging areas	Percent	Grading/ Dredging	Percent	Total	Percent
Ridgway's rail	Coastal and valley freshwater marsh	96.2	1.2	0.6	2%	55.15	57%	57	59%
	Southern coastal salt marsh nontidal	14.8	3.5	1.5	34%	0.37	3%	5.39	36%
	Total	**111.0**	**4.7**	**2.2**	**6%**	**55.52**	**50%**	**62.39**	**56%**
Western snowy plover	Beach	0.6	0	0.1	8%	0.45	75%	0.5	83%
	Total	**0.6**	**0**	**0.1**	**8%**	**0.45**	**75%**	**0.5**	**83%**
California least tern	Beach	0.6	0	0.1	8%	0.45	75%	0.5	83%
	Open water	106.8	0	0.1	0%	100.1	94%	100.1	94%
	Total	**Total**	**107.4**	**0**	**0.1**	**0%**	**100.5**	**100.6**	**94%**
Least Bell's vireo and southwestern willow flycatcher	Southern willow scrub	2.2	0.07	0	3%	0	0%	0.09	4%
	Total	**2.2**	**0.07**	**0**	**3%**	**0**	**0%**	**0.09**	**4%**
Belding's savannah sparrow	Southern coastal salt marsh nontidal	14.8	3.5	1.5	34%	0.4	3%	5.4	36%
	Total	**14.8**	**3.5**	**1.5**	**34%**	**0.4**	**3%**	**5.4**	**36%**
Coastal California gnatcatcher	Coastal scrub	0.6	0.4	0	60%	0	0%	0.4	60%
	Diegan coastal sage scrub: *Baccharis*-dominated	1.3	0.4	0.3	53%	0	0%	0.7	53%
	Total	**1.9**	**0.8**	**0.3**	**55%**	**0**	**0%**	**1.1**	**55%**

[1] Numbers may not sum exactly due to rounding.



Source: SANDAG 2012; Sangis 2014; Everest 2014; AECOM 2014

600 300 0 600 Feet

Scale: 1 = 7,200; 1 inch = 600 feet

Figure 3.5-14
Hybrid Alternative Options A&B Impacts to Special-Status Species

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In addition to direct impacts associated with temporary habitat loss, the light-footed Ridgway's rail is a year-round resident in the lagoon and is considered by local experts to be difficult to flush from habitat prior to construction. Therefore, the potential exists for mortality during vegetation removal. The project would initiate construction activities outside of the nesting season and would allow adequate time for Ridgway's rail and other wildlife to move into areas designated as sensitive "no construction" zones that would be identified and fenced or flagged to avoid impacts outside of the limits of disturbance, as described in Table 2-9, Standard Construction Practices. **However, temporary impacts to greater than 50 percent of the suitable habitat with implementation of the Hybrid Alternative (Options A and B) are considered significant (Criterion C).**

WESTERN SNOWY PLOVER

The western snowy plover suitable habitat is limited to the beach habitat west of the weir; impacts to 0.5 acre (83 percent) of beach habitat for this species would occur during construction (Table 3.5-13). Western snowy plover does not forage frequently within the BSA and likely no longer breeds there as historical nesting sites within the BSA have been altered by anthropogenic factors. As mudflat habitats suitable for foraging do not occur within the BSA, plover is currently not likely to occur; thus, this species is not likely to be impacted. **Therefore, temporary direct impacts to western snowy plover from the Hybrid Alternative (Options A and B) would be less than significant (Criterion C).**

CALIFORNIA LEAST TERN

California least tern is documented as annually foraging at Buena Vista Lagoon but is not known to breed in the lagoon. Impacts to 0.5 acre (77 percent) of beach and 100.8 acres (94 percent) of open water would occur as a result of grading/dredging and staging/vegetation drying for the Hybrid Alternative (Options A and B) (Table 3.5-13). Approximately 100.6 acres (94 percent) total acres of California least tern foraging habitat would be impacted as a result of construction for the Hybrid Alternative (Options A and B). No suitable nesting habitat occurs within the lagoon.

Sediment mobilization, increased turbidity, and the resulting impaired water quality could affect fish, which is the primary food of California least tern. However, foraging species are highly mobile and move throughout the lagoon as well as up and down the coast; as such, the temporary loss of their potential foraging habitat is not expected to have a significant impact on these species. In addition, areas west of I-5 post-implementation are expected to transition to saltwater habitats with improved conditions as a result of improved hydrology and tidal influx. The regular influx of tidal waters west of I-5 is expected to deliver larvae to the site, which may in turn

increase densities and species richness of the benthic community. **Therefore, temporary direct impacts to California least tern from the Hybrid Alternative (Options A and B) would be less than significant (Criterion C).**

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

One least Bell's vireo was observed during 2013 protocol surveys, and southwestern willow flycatcher was detected at a historical location outside of the project area. Both of these detections occurred within southern willow scrub habitat in the 500-foot buffer of the BSA. Southern willow flycatcher was not detected during 2013 surveys and is not known to occur within the BSA. Neither species has been documented to breed on-site although there is the potential that vireo breeding may occur as suitable southern willow scrub is present. Implementation of the Hybrid Alternative (Options A and B) would directly impact 0.1 acre (4 percent) of the southern willow scrub riparian habitat within the BSA (Table 3.5-13). Both least Bell's vireo and southwestern willow flycatcher are migratory birds. As vegetation would be removed outside of the breeding season and both species may use the riparian scrub for foraging during summer months, the short-term impact to 4 percent of the southern willow scrub riparian habitat is not substantial and would not result in a decline in the local population below self-sustaining levels (as a local population does not exist). **Therefore, temporary direct impacts to least Bell's vireo and southwestern willow flycatcher from the Hybrid Alternative (Options A and B) would be less than significant (Criterion C).**

BELDING'S SAVANNAH SPARROW

Belding's savannah sparrow currently occupies southern coastal salt marsh nontidal habitat. Observations are particularly dense in the eastern portion of the I-5 Basin where pickleweed-dominated marsh habitat is prevalent. It is intended that southern coastal salt marsh nontidal habitat in the I-5 Basin would be left undisturbed to the extent feasible; however, in a worst-case scenario, the entirety of this habitat type may be impacted. As a result of vegetation removal and grading/dredging and staging within the vegetation drying areas and staging areas, the Hybrid Alternative (Options A and B) would temporarily impact 5.4 acres (36 percent) of southern coastal salt marsh nontidal habitat across the four basins (Table 3.5-13 and Figure 3.5-14).

Temporary direct impacts to Belding's savannah sparrow are expected to be the same as the Freshwater Alternative and Saltwater Alternative. **The Hybrid Alternative (Options A and B) would have a significant temporary direct impact on Belding's savannah sparrow (Criterion C).**

COASTAL CALIFORNIA GNATCATCHER

Implementation of the Hybrid Alternative (Options A and B) would directly impact 0.4 acre (60 percent) of the coastal scrub habitat and 0.7 acre (53 percent) of Diegan coastal sage scrub: *Baccharis*-dominated at the eastern end of the BSA as a result of staging within the vegetation drying areas (Table 3.5-13). As vegetation would be removed outside of the breeding season and both species would likely use the site for foraging during summer months, the short-term impact to 1.1 acres (55 percent) of suitable scrub habitats on-site is greater than 50 percent. However, this would not be substantial and would not result in a decline in the local population below self-sustaining levels (as a local population does not exist). Additionally, habitat within the vegetation drying areas would be restored to pre-construction conditions after project implementation. **Therefore, temporary direct impacts to coastal California gnatcatcher from the Hybrid Alternative (Options A and B) would be less than significant (Criterion C).**

Short-term/Temporary Indirect Impacts

Indirect short-term/temporary impacts on sensitive species may include increases in exposure to predators as a result of nighttime lighting. These impacts are identical to those described for the Freshwater Alternative. **Temporary indirect impacts to sensitive species from nighttime lighting would be considered significant (Criterion C).**

Indirect noise impacts associated with the Hybrid Alternative (Options A and B) would be similar to those described for the Freshwater Alternative. The construction (grading/dredging) footprint for the Hybrid Alternative (Options A and B) is similar to the Freshwater Alternative. The overall construction approach is similar for both alternatives. **Similar to the Freshwater Alternative, short-term noise impacts on sensitive birds from implementation of the Hybrid Alternative (Options A and B) would result in a significant impact (Criterion C).**

As with the Freshwater Alternative, noise from increased vehicular traffic associated with implementation of the Hybrid Alternative (Options A and B) may also occur and would be similar. **Noise impacts to birds from vehicular traffic are therefore considered less than significant (Criterion C).**

Long-term/Permanent Direct Impacts

Direct permanent impacts on sensitive species include the active conversion of nesting and/or foraging habitat to another habitat type (west of I-5), modified lagoon conditions, and long-term maintenance and operation, including cattail maintenance. As described above, suitable habitat for sensitive species would be changed and/or converted as a result of the proposed project, west of

I-5. Many avian species can forage in either salt water and freshwater, but may not be able to breed at the lagoon, or would not remain a resident species, after lagoon habitat conversion. The direct permanent changes to suitable habitat for sensitive species are summarized in Table 3.5-14. These changes may include a direct increase or decrease in the total acreage of a specific habitat type post-enhancement. Proposed special-status wildlife species habitat is provided in Table 3.5-14.

Table 3.5-14
Hybrid Alternative (Options A and B) Existing and Post-Implementation Acreage of Suitable Habitat for Special-Status Wildlife Species (acres)[1]

Special-Status Species	Vegetation Community	Existing Habitat	Habitat Acreage Post-Implementation (Option A/ Option B[2])	Net Change in Habitat Acreage Post-Implementation (Option A/ Option B[2])
Light-footed Ridgway's rail	Coastal and valley freshwater marsh	96.2	10.2	-86.0
	Mudflat	0	4.7/4.9	4.7/4.9
	Southern coastal salt marsh nontidal	14.8	17.9	3.1
	Southern coastal salt marsh high	0	26.5	26.5
	Southern coastal salt marsh low	0	6.3/6.5	6.3/6.5
	Southern coastal salt marsh mid	0	20.3/20.6	20.3/20.6
	Total	**111**	**85.9/86.7**	**_-25.1/-24.3**
Western snowy plover	Beach	0.6	0.8	0.2
	Mudflat	0	4.7/4.9	4.7/4.9
	Total	**0.6**	**5.5/5.7**	**4.9/5.1**
California least tern	Beach	0.6	0.8	0.2
	Deep open water	0	5	5
	Mudflat	0	4.7/4.9	4.7/4.9
	Open water	106.8	99.3/98.4	_-7.5/-8.4
	Total	**107.4**	**120.8/120.5**	**13.4/13.1**
Least Bell's vireo and southwestern willow flycatcher	Southern willow scrub	2.2	2.2	0
	Total	**2.2**	**2.2**	**0**
Belding's savannah sparrow	Mudflat	0	4.7	4.7
	Southern coastal salt marsh nontidal	14.8	17.9	3.1
	Southern coastal salt marsh high	0	26.5	26.5
	Southern coastal salt marsh low	0	6.3/6.5	6.3/6.5
	Southern coastal salt marsh mid	0	20.3/20.6	20.3/20.6
	Total	**14.8**	**75.7/76.2**	**60.9/61.4**
Coastal California gnatcatcher	Coastal scrub	0.6	0.7	0.1
	Diegan coastal sage scrub	0.1	2.1	2
	Diegan coastal sage scrub: *Baccharis*-dominated	1.3	0	-1.3
	Total	**2**	**2.8**	**0.8**

[1] Numbers may not sum exactly due to rounding.
[2] Values are provided if they differ between Option A and Option B, as applicable.

Long-term monitoring and maintenance would be part of the Enhancement Project. This may include, but is not limited to, biological monitoring, nonnative species treatment, and other adaptive management strategies. Although each of these actions is intended to help the success of the enhancement effort, there is the potential for impacts to sensitive birds in the lagoon.

RIDGWAY'S RAIL

Ridgway's rail nesting and foraging habitat would be decreased as a result of the Hybrid Alternative (Options A and B). Post-enhancement, habitats would decrease due primarily to the loss of coastal and valley freshwater marsh habitat by a total of 62.4 acres (56 percent) (Table 3.5-14). However, implementation of the Hybrid Alternative (Options A and B) would result in the creation of six new habitat types considered suitable for light-footed Ridgway's rail, including mudflats, and low/mid/high southern coastal salt marsh habitat that would result in total post-implementation of 85.9 to 86.7 acres suitable for the rail. The loss of 25.1 to 24.3 acres is approximately 22 percent of the existing available habitat.

The existing southern coastal salt marsh nontidal and coastal and valley freshwater marsh habitat occupied by light-footed Ridgway's rail is denoted under existing conditions by the overall poor conditions of the lagoon resulting from poor tidal flushing and sediment accumulation, and these less than optimal conditions would continue without implementation of the Hybrid Alternative (Options A and B). Ridgway's rail observations have generally declined in the last 5 years (Zembal et al. 2013). This may correlate to the overall effect through time of the weir preventing the natural ocean-lagoon tidal processes. It is possible that, through opening of the channel and allowing for tidal influx west of I-5, changes to lagoon hydrology under the Hybrid Alternative (Options A and B) would also improve the condition of the foraging and nesting habitat for light-footed Ridgway's rail by providing habitat stratification, within and adjacent to the construction limits. It would be expected that the Ridgway's rail population would increase as the result of increased availability of optimal habitat. Ultimately, the project is expected to benefit light-footed Ridgway's rail populations at Buena Vista Lagoon. **Therefore, permanent impacts to light-footed Ridgway's rail with implementation of the Hybrid Alternative (Options A and B) would not be expected (Criterion C).**

The project would prepare an adaptive management, maintenance, and monitoring program that would include avoidance measures to minimize impacts to sensitive wildlife on-site, as described in Section 2.9. However, during cattail maintenance, there is potential for year-round mortality of birds in addition to take of nests during the breeding season. **As such, long-term maintenance activities would be considered significant (Criterion C).**

WESTERN SNOWY PLOVER

Western snowy plover nesting and foraging habitat would be increased as a result of the Hybrid Alternative (Options A and B). Post-enhancement, habitats would increase, with an increase of 0.2 acre to 0.8 acre of beach habitat (suitable for nesting and foraging), and creation of 4.7/4.9 acres of new mudflat habitat, suitable for foraging (Table 3.5-14). This species is currently not known to nest within the lagoon but is known to forage; thus, this increase in foraging habitat may be a potential benefit to this species. **As such, no significant or permanent impacts to western snowy plover would result from implementation of the Hybrid Alternative (Options A and B) (Criterion C).**

CALIFORNIA LEAST TERN

California least tern is documented as annually foraging at Buena Vista Lagoon. Implementation of the Hybrid Alternative (Options A and B) would permanently decrease suitable foraging habitat for California least tern (for Option A and Option B), decreasing what is currently 107.4 acres of suitable habitat by 13.4/13.1 acres (Table 3.5-14). Also, the result of open tidal influx, creation of mudflats (both west of I-5), and dredging accumulated sediment load may improve conditions for benthic species and fish species, as the improved circulation and mudflat habitat type would enhance environmental conditions for the prey communities that this bird feeds on. The Hybrid Alternative (Options A and B) would directly benefit species like tern that regularly use the lagoon for foraging, by adding diversity and increasing quality of foraging habitat. **As such, no significant permanent impacts to California least tern would result with project implementation of the Hybrid Alternative (Options A and B) (Criterion C).**

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

Suitable habitat for least Bell's vireo and southwestern willow flycatcher would not be present within the Hybrid Alternative (Options A and B), post-implementation. However, historical and/or recent locations of these species occur outside of the construction limits and neither of these migratory bird species is known to breed on-site. **As such, no significant permanent impacts to least Bell's vireo and southwestern willow flycatcher would result with project implementation of the Hybrid Alternative (Options A and B) (Criterion C).**

BELDING'S SAVANNAH SPARROW

Belding's savannah sparrow nesting and foraging habitat would be increased as a result of the Hybrid Alternative (Options A and B). Post-enhancement, habitats would increase, with creation

of five new habitat types considered suitable for Belding's savannah sparrow, including mudflats, and low/mid/high southern coastal salt marsh habitat (Table 3.5-14).

In addition, the changes to lagoon hydrology would increase the condition of the remaining foraging and nesting habitat suitable for Belding's savannah sparrow. Under current conditions, the frequency and duration of soil saturation in marsh habitat are highly variable and often affected by late season rains and ponding. This results in large fluctuations in the Belding's savannah sparrow population and nesting success each year, as this species can only nest on dry soil. It is possible that, through opening of the channel and allowing for tidal influx west of I-5, changes to lagoon hydrology under the Hybrid Alternative (Options A and B) would also improve the condition of the foraging and nesting habitat for Belding's savannah sparrow by providing habitat stratification, within and adjacent to the construction limits. Improved hydrology would overall improve circulation and flow, which would facilitate the drying of high-marsh habitat used for ground nesting. **The improved conditions post-implementation of the Hybrid Alternative (Options A and B) would ultimately benefit the Belding's savannah sparrow population at Buena Vista Lagoon and permanent impacts are considered less than significant (Criterion C).**

Long-term monitoring and maintenance would be part of the Enhancement Project. This may include, but is not limited to, biological monitoring, nonnative species treatment, and other adaptive management strategies. Although each of these actions is intended to help the success of the enhancement effort, there is the potential for impacts to sensitive birds in the lagoon. To minimize impacts, the project would prepare an adaptive management, maintenance, and monitoring program that would include avoidance measures to minimize impacts to sensitive wildlife on-site. **As such, long-term monitoring and maintenance activities are not expected to have a substantial effect on any sensitive species, and permanent impacts from the Hybrid Alternative (Options A and B) are considered less than significant (Criterion C).**

COASTAL CALIFORNIA GNATCATCHER

Post-implementation of the Hybrid Alternative (Options A and B), there would be an increase of 0.1 acre of suitable habitat, including a new habitat, Diegan coastal sage scrub (0.1 acre), suitable to support coastal California gnatcatcher (Table 3.5-14). As such, **no significant permanent impacts to coastal California gnatcatcher would result with project implementation (Criterion A).**

Long-term/Permanent Indirect Impacts

The types of long-term permanent impacts as a result of the Hybrid Alternative (Options A and B) would be similar as discussed for the Freshwater Alternative and Saltwater Alternative. Cattail

maintenance would occur during daylight hours and outside of the breeding season, as noted in Chapter 2 (PDF-11). Indirect impacts associated with long-term cattail maintenance due to nighttime lighting and noise would not occur. **Long-term/permanent indirect impacts to sensitive species resulting from nighttime lighting and noise would be considered less than significant (Criterion C).**

Special-Status Nonlisted Wildlife Species

Impacts to nonlisted special-status wildlife species associated with the implementation of Hybrid Alternative (Options A and B) would be the same as the Freshwater Alternative and Saltwater Alternative as the extent of grading/dredging is similar. Impacts to nonfederally listed wildlife species are not expected to result in the decline of any species below self-sustaining levels. However, potential impacts that may occur include mortality of individuals within the project footprint during the breeding season, and increased predation (as a result of nighttime lighting) and construction noise impacts to nonfederally listed special-status bird species within and adjacent to the project footprint. **Short-term direct and indirect impacts would be significant (Criterion C).**

Long-term direct and indirect impacts to nonfederally listed special-status species may also occur as a result of cattail maintenance activities. Maintenance would be scheduled outside the breeding season and during daytime hours, and the potential for mortality, noise impacts, and increased predation would be minimized. **Long-term direct and indirect impacts would be less than significant (Criterion C).**

Wildlife Corridors/Connectivity

The Hybrid Alternative (Options A and B) would have similar temporary and short-term impacts to wildlife corridors and connectivity as discussed for the Freshwater Alternative and Saltwater Alternative. The lagoon is not considered a regional wildlife corridor, but no long-term impacts are anticipated. The lagoon would still function as a large area of natural open space corridor that would allow for wildlife movement and connectivity similar to existing conditions. **Therefore, no significant short-term or long-term impacts to wildlife movements or connectivity are anticipated with implementation of the Hybrid Alternative (Options A and B) (Criterion D).**

Local Ordinances/Policies/Adopted Plans

Similar to the Freshwater Alternative and Saltwater Alternative, all restoration, maintenance, and monitoring plans prepared for the Hybrid Alternative (Options A and B) would be prepared in

accordance with the goals of these regional conservation plans, and in consultation with the wildlife agencies. **The project is consistent with the goals and objectives of the MHCP,** draft Oceanside Subarea Plan, final Carlsbad subarea plan, City of Carlsbad Habitat Management Plan, and the LCPs of both cities**. Therefore, no significant impact would result with implementation of the Hybrid Alternative (Options A and B) (Criterion E).**

Long-term Benefits

The Hybrid Alternative options would provide benefits to biological resources, although not to the extent of the Saltwater Alternative. Under the Hybrid Alternative, available nesting habitat for threatened and endangered species would decrease compared to existing conditions (from 101.5 to 90–91 acres). The quality of remaining habitat is anticipated to increase, however, as the portion of the lagoon west of I-5 is converted to a marine system and vegetated with native salt marsh habitats, and remaining freshwater areas east of I-5 are maintained through the creation of channels that increase proximity to foraging habitat and increase localized water quality. As described for the Freshwater and Saltwater Alternatives, the Hybrid Alternative would also remove encroaching freshwater marsh vegetation and halt the conversion of open water to freshwater marsh that is currently reducing fish habitat and circulation within the lagoon. Fish species, particularly saltwater species west of I-5, would benefit from this improved water quality and from the creation of deep water habitat areas. As described in Section 3.5.1 and in the Biological Resources Technical Report, Buena Vista Lagoon contains large amounts of suitable habitat for the western pond turtle. Implementation of the Hybrid Alternative could improve the available habitat for this special-status nonlisted species.

No Project Alternative

Sensitive Riparian and Natural Vegetation Communities, and Jurisdictional Waters and Wetlands

Habitats, land cover types, and jurisdictional waters and wetlands would remain relatively the same under the No Project Alternative and the present spectrum of environmental constraints would continue to limit the quality and productivity of the lagoon. It is possible the existing southern coastal salt marsh habitat may decline with the continued absence of saltwater influx, and it would likely become freshwater marsh. The No Project Alternative would not improve lagoon ecology and the lagoon would not benefit from the improved water quality and increased habitat diversity provided by the Enhancement Project. **Although habitats and wetlands would continue to degrade, there would be no overall net loss of sensitive habitats and a significant impact would not occur (Criterion A).**

Special-status Flora and Fauna and Wildlife Corridors

The current and potential future southern coastal salt marsh nontidal and coastal and valley freshwater marsh habitat occupied by special-status species (i.e., light-footed Ridgway's rail) is characterized under existing conditions by the overall poor conditions of the lagoon resulting from poor tidal flushing and sediment accumulation. These less than optimal conditions would continue without implementation of the Freshwater Alternative, and the quality of habitats would decline. Similarly, anticipated habitat conversion of existing southern coastal salt marsh would result in a net loss of nesting habitat for light-footed Ridgway's rail (low-marsh) and Belding's savannah sparrow (high-marsh) in addition to other migratory birds that use the lagoon for foraging habitat. The extent to which habitat quality would decrease is speculative, and would depend on the rate and pattern of sedimentation and vegetation encroachment. It is anticipated that wildlife corridors would function similarly without implementation of the proposed Enhancement Project. **There would be a decrease in the quality of habitats within the construction limits for all of the alternatives; therefore, short-term and long-term impacts to light-footed Ridgway's rail and Belding savannah sparrow would be significant (Criterion C).**

The availability for use of the lagoon by wildlife species for local movement would remain the same without implementation of the project. **No impacts to wildlife movement would be expected (Criterion C)**.

Local Ordinances/Policies/Adopted Plans

The MHCP and the Oceanside LCP refer to the opportunity for enhancement at Buena Vista Lagoon. While the No Project Alternative represents a lost opportunity for enhancement to a preserve area designated within this plan, the lack of enhancement does not specifically represent a conflict with these plans. **Efforts for preserve management and monitoring would continue consistent with the goals and objectives of this plan and would not result in a significant impact (Criterion E).**

Materials Disposal/Reuse

Specific locations have been carried forward for potential materials disposal/reuse based on historic project site boundaries, including the 2012 RBSP implemented by SANDAG and the Navy Homeporting Project. The 2012 SANDAG RBSP included two nearby beach locations—Oceanside and North Carlsbad. These sites, due to their proximity to the project site and their previous us as materials placement sites (based on past projects), are determined as suitable for materials placement for the proposed project. Under each of the alternatives, a combination of

different strategies could be implemented based on sediment characteristics. Different volumes of sand placement are required for each of the alternatives as shown in Table 3.5-15. Sand placement would occur over only a portion of the proposed beach and nearshore placement sites. Because under all alternatives, the project proponent would like to retain flexibility in the location of sand placement, and regardless of alternative selected, sand disposal volumes would be far below that conducted for previous projects, the differences in impacts would be negligible. There would be minimal difference in impacts when comparing the different alternatives. Therefore, this section describes impacts at each disposal site, regardless of alternative selected, and notes differences in alternatives, where relevant.

Table 3.5-15
Estimated Direct Impact Acreage from Materials Placement

Receiver Site	Dimensions		Acres	Capacity Based on Historical Projects (cy)	Approach 1 (acres)	Approach 2 (acres)
	Length (ft)	Width (ft)				
Freshwater Alternative						
Onshore						
Oceanside	4,100	319	30	420,000	3.5	12.5
North Carlsbad	3,100	260	18.5	225,000	0	0
Nearshore						
Oceanside (nearshore)	3,170	2,285	166	2,460,000	2.0	26.1
Saltwater Alternative						
Onshore						
Oceanside	4,100	319	30	420,000	7.9	16.6
North Carlsbad	3,100	260	18.5	225,000	0	0
Nearshore						
Oceanside (nearshore)	3,170	2,285	166	2,460,000	3.3	37.0
Hybrid Alternative (Options A and B)						
Onshore						
Oceanside	4,100	319	30	420,000	9.3	18.2
North Carlsbad	3,100	260	18.5	225,000	0	0
Nearshore						
Oceanside (nearshore)	3,170	2,285	166	2,460,000	3.4	39.0

Short-term/Temporary and Long-term/Permanent Direct Impacts

Direct impacts are summarized below for each receiver site.

Sand Placement

Onshore

OCEANSIDE

The maximum beach placement site footprint is approximately 30 acres with capacity of 420,000 cy based on historical projects (Table 3.5-15). Sand placement would vary by alternative and would only occur over a portion of this overall area, as shown in Table 3.5-15. Maximum placement at the Oceanside beach placement site would likely occur under the Hybrid Alternative, where Approach 1 would place approximately 129,500 cy over 9.3 acres and Approach 2 would place approximately 255,000 cy over 18.2 acres. Habitat within the site boundaries is sand and cobble, and no sensitive hard-bottom or vegetated habitat occurs within the site boundaries. Marine invertebrates living within the sands would be killed from burial and construction activities, but the reduction in invertebrates would be temporary. Recovery would occur within several months, the speed of which would depend on project timing. Impacts to grunion would be avoided and minimized by pre-construction habitat assessments, monitoring, or other conditions established during the permitting process. **Therefore, permanent and temporary direct impacts would be expected to be less than significant (Criterion A).**

NORTH CARLSBAD

The maximum beach placement site footprint is approximately 18.5 acres with capacity of 225,000 cy based on historical projects (Table 3.5-15). Based on preliminary estimates, no placement at the North Carlsbad site is anticipated, although the site could provide additional capacity, if suitable material is identified prior to construction. In addition, under the Saltwater and Hybrid Alternatives, North Carlsbad may be used for sand disposal required during inlet maintenance (approximately 27,000 cy every 12 to 20 months). No sensitive hard-bottom or vegetated habitat occurs within the site boundaries. Similar to the Oceanside receiver site, direct impacts to marine life within the fill footprint would not be substantially adverse, and impacts to grunion would be avoided and minimized by pre-construction habitat assessments, monitoring, or other conditions established during the permitting process. Therefore, direct impacts would be less than significant. (Criterion A).

Nearshore

The maximum nearshore placement site footprint is approximately 166 acres with capacity of 2,460,000 cy based on historical projects (Table 3.5-15). Sand placement would vary by alternative and would only occur over a portion of this overall area, as shown in Table 3.5-15. Maximum placement at the Oceanside beach placement site would likely occur under the Hybrid Alternative, where Approach 1 would place approximately 51,000 cy over 3.4 acres and Approach 2 would place approximately 578,000 cy over 39 acres. Habitat within the site boundaries is sand. There would be a temporary reduction in benthic invertebrate biomass and alteration of the benthic community species composition at the nearshore disposal site associated with the sediment disposal. Studies indicate that recovery of the benthic invertebrate community depends on several factors such as placement method, local environmental conditions, hydrodynamics, and sediment infill rates. Reported recovery rates for dredging nearshore sandy subtidal habitat generally range from 2 to 4 years when hydrodynamics and sediment characteristics are not substantially changed within the dredged area. **Because no sensitive species are known to occur at the nearshore placement site and invertebrate populations would be expected to recover within 2 to 4 years, direct impacts are considered less than significant (Criterion C).**

Pipeline/Equipment Placement

Sand placement at the Oceanside nearshore materials placement site would consist of extending a pipe from Oceanside beach along the ocean floor to the proposed placement location. Material excavated from the lagoon would be directly discharged through that pipeline into the nearshore, and the site would be filled from the ocean floor up. A pre-construction survey would be completed for pipeline routes to ensure no sensitive resources are directly impacted by pile placement. **With completion of the pre-construction survey to avoid any sensitive resources, no direct impacts to nearshore resources due to pipeline or equipment placement would occur (Criterion C).**

Short-term/Temporary and Long-term/Permanent Indirect Impacts

Onshore/Nearshore

Shorebird Forage Reduction, Alteration, or Modification

There is potential for indirect impacts on shorebird foraging from burial of invertebrates within the footprint of the beach placement sites. Each beach placement site has unaffected shoreline nearby that would remain available for foraging shorebirds. In addition, recolonization of the

receiver site by invertebrates would be rapid (e.g., weeks to months) following the conclusion of sand placement activities. **Therefore, impacts would be considered less than significant (Criterion C).**

Temporary attraction of birds, particularly gulls, to the discharge location is anticipated based on observations from the 2001 RBSP and other beach nourishment projects. The birds are attracted to the sand slurry pumped onto the beach or its return water, where they opportunistically forage on deceased invertebrates and organic debris originating from the borrow site. Similarly, fish that feed on plankton or small organic particles may be attracted to turbidity plumes associated with the hydraulic dredge-pump of sediment; presumably to feed on discharged organic particulates. Fish-feeding birds may be attracted in turn to an increased concentration of fish where water clarity is sufficient for them to locate their prey. No adverse impacts on seabird or waterbird foraging were observed with implementation of the 2001 RBSP. Bird surveys in areas of the borrow and receiver sites identified no impacts of dredging or discharge turbidity on bird foraging behavior or locations. Turbidity plumes are expected to be localized and short term in duration, similar to those experienced during the 2001 and 2012 RBSPs. **Therefore, permanent and temporary indirect impacts would be less than significant (Criterion C).**

Threatened and Endangered Species

The receiver sites are located more than 3 miles from least tern nesting sites. While there is a potential for this species to forage within ocean adjacent to the beach placement sites, project activities would not be expected to adversely affect foraging of the species, based on the localized nature of turbidity plumes expected during construction. Therefore, impacts would be less than significant.

The Enhancement Project is located approximately 6 miles from snowy plover critical habitat adjacent to Batiquitos Lagoon. This species nests at Batiquitos Lagoon and has been observed to forage at the beach in the vicinity of the Batiquitos Lagoon. While there is a potential for this species to forage within the beach placement sites, project activities would not be expected to adversely affect foraging of the species, based on the availability of adjacent foraging areas and limited area of impact at the beach placement sites. **Since no construction would occur within designated or proposed critical habitat and no significant impacts are anticipated to foraging birds, impacts would remain less than significant (Criterion C).**

Disturbance, Displacement, or Interference

Operational noise from equipment and activities has the potential to disturb shorebirds, gulls, and other coastal birds that may forage or rest on beaches at or near the placement sites. This impact

would be less than significant because of the following: (1) disturbance impacts that would be temporary and limited to the period of construction; (2) the proximity of unaffected shoreline adjacent to the receiver sites that provides foraging opportunities; and (3) the forage base at the receiver site that would rapidly recover following the conclusion of sand placement activities.

Artificial night lighting has the potential to disturb or attract wildlife. Grunion have been documented to spawn in the vicinity of beach disposal operations. Some reports suggest that grunion spawning may be reduced in well-lighted areas, while other reports document spawning near lighted areas such as piers. It is not well understood to what extent grunion may be attracted or displaced from spawning at a beach from artificial lighting or other equipment-related disturbance. Impacts to grunion would be less than significant because habitat suitability assessments and monitoring during construction as outlined in the project design features would be implemented to minimize impacts to the species. (Criterion C).

Turbidity

The primary indirect impact from the Freshwater Alternative includes potential degradation of water quality through the generation of turbidity by dewatering dredged material at the beach, nearshore disposal site, and, if used, offshore barges. Turbidity can have a number of impacts on marine biota. Sedimentation associated with the settlement of suspended sediment from turbidity plumes has the potential to impact organisms or plant recruitment in hard-bottom habitats. Sedimentation generally is less of a concern for soft-bottom habitats unless within spawning grounds.

Turbidity would be expected to be localized to the discharge location, generally within 500 feet or less. Plumes would be expected to be largely confined within the surf zone but may be incorporated by rip currents and carried farther offshore. Because the sediments are generally sandy, project-related turbidity is expected to quickly settle and plumes would be temporary.

While BMPs would be implemented (e.g., screening the material), turbidity plumes would still be generated. Turbidity can be influenced by many factors, including characteristics of dredged material, water depth, and hydrodynamic forces (mixing, currents, etc.). The degree of turbidity depends largely on the size of the sediment particles. Extremely fine material such as clay and silt have a tendency to quickly go into suspension during the dredging process and stay suspended for a longer time due to their small settling velocities. Fines may be expected to settle on the order of several hours at the 45- to 75-foot depths, while coarser-grained materials, such as sands, would tend to settle on the order of several minutes at similar depths.

The elevated suspended solids concentrations in turbidity plumes reduce water clarity/light transmittance and increase discoloration. The estimated plume distance on any given day would

vary according to the grain size characteristics of the material dredged during that day, turbulence, current speed, and to what depth in the water column the particles are resuspended. Use of the overall mean grain size diameter represents an indication of average plume extent. Under maximum expected current speeds (0.5 to 1.5 knots), the predicted downcurrent plumes range from approximately 900 to 1,600 feet. However, silt/clays resuspended during dredging may travel longer distances.

Resuspension of sediments can also affect other water quality parameters such as dissolved oxygen and pH within the zone of influence. As noted above, this would depend on numerous environmental factors, although it is anticipated any impacts would be short term and localized. No long-term reductions in water quality would be anticipated due to the diluting capacity of the ocean, localized nature of the turbidity plumes, and rapid dissipation once dredging operations ceased. **Therefore, impacts to other water quality parameters would be less than significant (Criterion A).**

Since it is assumed that the material is suitable for nearshore or ocean disposal, and permitted to be disposed of, no impacts are anticipated from potential impacts associated with contaminants.

Sediment that is unsuitable for beneficial use (<70 percent sand) would be transported to LA-5 via a barge. During transfer of sediment onto the barge turbidity could be generated. Turbidity would be minimized through the piping of excess water back to the lagoon to minimize nearshore water quality impacts.

During placement at the beach placement site, turbidity would be minimized by the construction of training dikes that would promote settlement of sediment on the beach and lower the amount of suspended sediment that is lost to the return waters (PDF-6). This design feature was implemented during the 2001 and 2012 RBSPs and was found effective for minimizing turbidity plumes at the receiver sites. With this project design feature, suspended sediment would be minimized, thereby minimizing potential impacts associated with the range of exposure durations that may occur depending on equipment type and differences in receiver site configurations. **Therefore, impacts would be less than significant (Criterion A).**

KELP

Kelp beds occur from approximately 1,400 to 6,700 feet offshore of the receiver sites, which is outside the distance that turbidity plumes would be expected to travel offshore unless carried by rip currents. In the unlikely event that turbidity did extend offshore, the particulate concentration would be expected to be low enough to have a negligible effect on the kelp bed. **Therefore, impacts would be less than significant (Criterion A).**

VEGETATED REEFS

Nearshore vegetated reefs have the potential to be impacted by reduced light transmittance and siltation associated with turbidity plumes. Turbidity also has the potential to cause physiological stress, reduced feeding, or displacement of mobile marine invertebrates or fish in reef areas. Actual impacts would depend on the concentration and duration of turbidity. While marine invertebrates and bottom-associated fish are generally tolerant of high turbidity such as naturally occurs during high wave or storm conditions, adverse impacts may result from exposure to very high concentrations or moderate to high concentrations for prolonged periods. As noted, turbidity plumes associated with the project would be relatively small, localized, and of short duration. Furthermore, suspended sediment concentrations in turbidity plumes would be minimized by use of training dikes, a key project design feature (PDF-6). **Therefore, impacts would be less than significant (Criterion A).**

PLANKTON, PELAGIC FISH, AND MARINE MAMMALS

As discussed above, the impacts of suspended particulates on plankton are generally considered negligible because of the limited area affected and short exposure time as plankton drift through the affected areas. Similarly, potential impacts on fish would be limited and temporary in nature, and a number of studies have documented variable responses by fish that range from attraction to avoidance. Pelagic fish offshore of the receiver sites, and any marine mammals that ventured close to shore, would not be expected to be adversely affected because the turbidity would remain localized and short term, and similar to conditions that may be experienced during storm events. **Therefore, impacts would be less than significant (Criterion A).**

Sedimentation

Beach sand placed on receiver sites would eventually be washed by waves and redistributed offshore and alongshore through natural processes. There is the potential for sand introduced into the system to indirectly impact sensitive habitats and resources if sand deposits on those resources occur at sufficient depth and persistence to result in burial or degradation of those resources. To estimate potential impacts to sensitive habitats, a suite of indicator species of relatively higher quality reef habitats has been identified including surfgrass, feather boa kelp, sea fans, sea palms, and giant kelp.

Evaluating potential indirect sedimentation impacts is complex and impact conclusions must be determined in light of the dynamic ocean system, where seasonal and annual changes in sand elevation naturally occur, and an understanding must be developed of the life history of sensitive

species and their relative distribution on nearshore reefs. Numerical modeling has been successfully used to predict and simulate changes in shoreline morphology for the 2001 and 2012 RBSPs (SANDAG 2011). The sand is proposed to be placed at two beach disposal sites, Oceanside Beach and North Carlsbad Beach, which have been previously modeled for the 2001 and 2012 RBSPs. Marginally suitable sediment is proposed to be placed at the Oceanside nearshore location. These beach and nearshore locations have been permitted and used for this type of disposal numerous times in the past, with extensive physical monitoring. Data and conclusions from these previous projects were used to estimate both short-term and long-term shoreline and profile changes resulting from the Enhancement Project alternatives. Regardless of the alternative selected, the total volume of sand placement anticipated is less than or similar to the Corps Dredge Disposal, 2001 RBSP, and 2012 RBSP. Therefore, the long-term (e.g., 3 to 10 years) shoreline and profile changes should be less than those predicted, permitted, and experienced for those projects, and no long-term burial of habitat with sensitive indicators was predicted. **Therefore, impacts would be less than significant (Criterion A).**

Essential Fish Habitat and Fish Resources

Impacts to water column EFH and soft-bottom benthic habitat at the nearshore construction area are anticipated and would constitute temporary adverse impacts (e.g., temporary turbidity plume due to dredging or disturbance to soft-bottom habitat from pipeline and anchors, loss of prey items). Similarly, temporary adverse impacts to life stages of managed species are expected to occur as a result of the project. Based on the analysis in the preceding sections, substantial adverse impacts on quality or quantity of hard-bottom benthic habitat EFH and Habitat Areas of Particular Concern (e.g., rocky reefs) are not anticipated. **Therefore, less than significant impacts are anticipated (Criterion D).**

Other Construction Issues

Operation of equipment on the beach or dredges and support vessels has the potential to introduce contaminants to the marine environment from minor spills and leaks. The potential for accidental discharge also could result from collision with or by another vessel. The probability of both types of accidental discharges is considered low. The dredging contractor would be required to develop a Spill Prevention Control and Containment (SPCC) plan prior to initiating construction. If a spill occurred, the contractor would implement BMPs to prevent long-term degradation of water quality. **For these reasons, impacts to biological resources from accidental discharges would remain less than significant (Criterion A).**

No Project Alternative

Under the No Project Alternative, no materials disposal or placement would occur in the littoral cell. There would be no additional sand placed on area beaches in the cities of Oceanside or Carlsbad as part of the Enhancement Project, although it is assumed other independent projects that place materials in the Oceanside Littoral Cell would continue (e.g., Oceanside Harbor maintenance dredging). In addition, the opportunistic use of sand material is a potential byproduct of the Enhancement Project, but not a project objective. **No impact would occur to biological resources under the No Project Alternative (Criteria A through E).**

3.5.4 MITIGATION MEASURES

Lagoon Enhancement

A summary of lagoon impacts by alternative is provided in Table 3.5-16. Mitigation measures to address significant impacts are also identified as Biological Resources-1 through Biological Resources-8 within the table, and discussed below. Significance of impacts after mitigation is then identified.

Biological Resources-1: Prior to construction, a preconstruction survey shall be conducted to confirm the number of individual southwestern spiny rush plants and their locations within the construction footprint. Each plant, after mapping, shall be salvaged to avoid direct impacts and held at a nursery during the entirety of construction. Post construction, salvaged plants shall be replanted in habitats similar to pre-construction conditions.

Biological Resources-2: A qualified biological monitor shall flush birds by walking ahead of construction equipment prior to grading in undeveloped, terrestrial habitats suitable to support sensitive birds to help avoid mortality of bird species during construction activities.

Biological Resources-3: Vegetation grubbing and removal shall occur outside of the bird breeding season (February 1 through September 15) to avoid potential take of nesting birds.

Biological Resources-4: A qualified biologist shall prepare and implement a targeted predator control plan for light-footed Ridgway's rail and Belding's savannah sparrow. Activities would include fencing, public signage, selective vegetation removal (i.e., invasive species or native species not preferred by Belding's savannah sparrow), construction of nesting platforms, perch removal, predator trapping/control, and/or other techniques to minimize predation of the species during construction and the post-construction monitoring period.

Table 3.5-16
Summary of Impacts to Biological Resources by Alternative

CEQA Threshold of Significance Category			Alternatives				Mitigation Measures	Significance After Mitigation
Impacts to:	**Time Scale and Topic**		**Freshwater**	**Saltwater**	**Hybrid A/B**	**No Project**		
Sensitive Riparian and Natural Vegetation Communities	Short Term		Significant direct impact (beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub)	Significant direct impact (beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub)	Significant direct impact (beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub)	Less than significant	None feasible	Significant for removal of habitat
	Long Term		Less than significant direct impact	Less than significant direct impact	Less than significant direct impact	Less than significant	NA	NA
Jurisdictional Waters and Wetlands	Short Term		Less than significant direct impact	Less than significant direct impact	Less than significant direct impact	Less than significant	NA	NA
	Long Term		Less than significant	Less than significant	Less than significant	Less than significant	NA	NA
Sensitive Species	Short Term	Flora	Significant direct impact (southwestern spiny rush)	Significant direct impact (southwestern spiny rush)	Significant direct impact (southwestern spiny rush)	No impact	Biological Resources-1	Less than significant for spiny rush
		Fauna	Significant direct impacts to Ridgway's rail, Belding's savannah sparrow, and nesting birds Significant indirect impact to Ridgway's rail, Belding's savannah sparrow, and nesting birds	Significant direct impacts to Ridgway's rail, Belding's savannah sparrow, and nesting birds Significant indirect impact to Ridgway's rail, Belding's savannah sparrow, and nesting birds	Significant direct impacts to Ridgway's rail, Belding's savannah sparrow, and nesting birds Significant indirect impact to Ridgway's rail, Belding's savannah sparrow, and nesting birds	Significant direct impacts to Ridgway's rail and Belding's savannah sparrow	Biological Resources-2 and 3 Biological Resources-4 through 7	Significant for removal of Ridgway's rail habitat, Less than significant for risk of mortality and take of nests Significant for noise; less than significant for increased predation and population concentrations
		Wildlife Corridors/ Connectivity	Less than significant	Less than significant	Less than significant	No impact	NA	NA
	Long Term	Flora	Less than significant	Less than significant	Less than significant	No impact	NA	NA
		Fauna[1]	Significant direct impact to Ridgway's rail Less than significant indirect impact	Less than significant direct impact Less than significant indirect impact	Significant direct impact to Ridgway's rail Less than significant indirect impact	Significant direct impacts to Ridgway's rail and Belding's savannah sparrow	Biological Resources-8 NA	Less than significant for risk of mortality NA

CEQA Threshold of Significance Category		Alternatives				Mitigation Measures	Significance After Mitigation
Impacts to:	**Time Scale and Topic**	**Freshwater**	**Saltwater**	**Hybrid A/B**	**No Project**		
	Wildlife Corridors/ Connectivity	Less than significant	Less than significant	Less than significant	No impact	NA	NA
Local Ordinances, Policies, Adopted Plans	Short Term	No impact	No impact	No impact	No impact	NA	NA
	Long Term	No impact	No impact	No impact	No impact	NA	NA

[1] Long-term impacts related to cattail maintenance would only occur under the Freshwater and Hybrid (Option A and B) Alternatives.

Biological Resources-5: Lights shall be downshielded to direct the light down toward the area of work and minimize spillage or glare (same as Visual-2).

Biological Resources-6: Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers (same as Noise-1).

Biological Resources-7: Exposed engines on dredging equipment shall be housed to the greatest extent possible (same as Noise-2).

Biological Resources-8: (Freshwater and Hybrid Alternative Only) During cattail maintenance, a qualified biologist shall flush birds by walking ahead of construction equipment prior to grading in undeveloped, terrestrial habitats suitable to support Ridgway's rail to help avoid mortality.

With the implementation of the mitigation measures above, specific impacts would remain significant and unmitigated, as identified in Table 3.5-16 and described below. Because this project is an enhancement project focused on improving the water quality and biological diversity of the lagoon, substantial time and effort went into the planning for, and avoidance of, short-term and long-term impacts to species and their habitats. Because the temporal loss of habitats may threaten local populations of sensitive resident species, this short-term direct impact is considered significant. While no feasible mitigation is available for the short-term direct loss of these habitats and the impact would remain significant, the short-term impacts would be balanced by long-term benefits overall ecological benefits from long-term improved habitat quality and diversity. Short-term direct impacts to vegetation communities would remain significant.

Short term impacts to southwestern spiny rush would be reduced to less than significant through salvage and replanting of individuals within the construction footprint (Biological Resources-1), but impacts to Ridgway's rail would remain significant due to removal of habitat, for which no feasible mitigation is available. Impacts due to risk of mortality to Ridgway's rail, Belding's savannah sparrow, and take of nests for breeding birds would be reduced to below a level of significance through the restriction of grubbing and vegetation removal to outside the breeding season and flushing birds in suitable habitat prior to grading during the remainder of the year (Biological Resources-2 and 3).

Short term indirect impacts associated with increased predation due to lighting would be mitigated to below a level of significance through Biological Resources-4 and 5, which require predator control and shielding of lighting. Although noise control would be required on construction equipment through Biological Resources-6 and 7 and would reduce noise levels

during construction, there is still the potential for indirect impacts to sensitive species due to dredge equipment during the breeding season.

Long-term/permanent direct impacts to Ridgway's rail and nesting birds during cattail maintenance would be mitigated to less than significant through the implementation of Biological Resources-8, which requires flushing birds from cattails prior to maintenance activities.

With the implementation of the feasible mitigation measures identified above, it is anticipated that short-term impacts to the loss of vegetation communities and habitat loss for Ridgway's rail would remain significant and unmitigated. Indirect noise impacts during construction would also remain significant. Other impacts to biological resources would be reduced to below a level of significance. No mitigation measures have been identified that would reduce short-term impacts to vegetation, although the loss would be temporary. Mitigation measures identified that could potentially reduce indirect noise impacts to sensitive species to below a level of significance were considered to reduce this impact, but were rejected, as described below. These included noise walls, limiting work to grading outside the breeding season and establishment of nest buffers. Noise impacts from nighttime dredging and materials placement remain significant and unavoidable with implementation of the Freshwater, Saltwater, and Hybrid Alternatives.

Noise walls – In an upland environment, temporary noise walls are often required as mitigation, and constructed between the construction site and adjacent habitat. These walls typically are stationary features with strong footings for support and constructed of plywood. This physical buffer between the construction area and habitat can lower noise levels in adjacent habitat. Because the dredge would be moving through the lagoon during construction, and the habitat of concern is directly adjacent freshwater marsh habitat, construction of a noise wall would have to occur in wet and unstable soil conditions. The wall would be required along a substantial length of the lagoon on both north and south sides. Construction of the walls, with footings in a wet environment and strength for 2-year-long duration, would result in direct impacts to adjacent habitat that would otherwise not be disturbed by the enhancement, and could hinder marsh species from accessing open water areas or adjacent habitat areas within the lagoon itself. The physical impacts associated with construction of the noise walls, and the introduced barrier to lagoon access, would substantially reduce or eliminate the value of this mitigation measure. Noise walls are considered an infeasible mitigation measure.

Limiting work to outside nesting season – A work schedule requiring all work to be conducted outside of the bird nesting season was considered. This would completely halt construction between February 15 and September 1. The stop and start schedule would

extend the overall construction duration substantially (depending on dredge volumes). Construction duration is now estimated at 15 to 30 months and could be doubled. The longer construction duration could result in additional years of disruption to foraging birds (including two sensitive resident birds—Belding's savannah sparrow and light-footed Ridgway's rail). A longer duration would potentially result in greater impacts than temporary construction noise during the breeding season, in part because the dredge would be mobile and only a portion of nesting habitat would be within the range of the dredge noise at any given time. A mitigation measure requiring work outside of the nesting season was determined to be biologically undesirable and therefore infeasible.

Establishing buffers around nests – Conducting surveys for nests of sensitive species and establishing 500-foot buffers around each nest was considered to limit the exposure of nesting birds to noise. Conducting surveys in the existing dense cattail areas would be extremely difficult to complete effectively, and the number of birds is anticipated to be high enough that construction during the breeding season would effectively be prevented once all nests were buffered to 500 feet. As discussed above, limiting construction to outside the breeding season would extend, and possibly double, the construction period overall and ultimately be ineffective in reducing impacts to resident species such as light-footed Ridgway's rail and Belding's savannah sparrow. Establishing buffers around active nests was determined to be infeasible for substantially reducing biological impacts.

Materials Disposal

With incorporation of standard construction measures, as outlined in Table 2-9, as well as specific project design features, as outlined in Table 2-11, no significant impacts would occur. Therefore, no mitigation measures are proposed for impacts to biological resources associated with materials disposal.