

BELDING'S SAVANNAH SPARROW

Belding's savannah sparrow 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. 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.

Within the BSA, the Belding's savannah sparrow is a common resident within the pickleweed marsh. Surveys were conducted within the lagoon from 1973 through 2009. Surveys in 2009 by Robert Patton documented observations of the sparrow within the lagoon with mapped locations and annotations of the behavior including but not limited to pairing, singing, posting/perching, chasing, foraging, and flying. Pairs included those observed nest building and feeding young. Surveys in 2009 indicated that 136 pairs occurred within the BSA (Patton 2010). No species-specific surveys were conducted for Belding's savannah sparrow during 2010 and 2011. During monthly bird counts during 2010 and 2011, this species was observed in several locations in all three basins (Patton 2012b) (Figure 3.6-8).

Nonlisted Special-Status Wildlife Species

In addition to the federally and state-listed species discussed above, 13 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 errans*), orange-throated whiptail (*Aspidoscelis hyperythra beldingi*), silvery legless lizard (*Anniella pulchra pulchra*), Cooper's hawk (*Accipiter cooperi*), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), western bluebird (*Sialia Mexicana*), white-tailed kite (*Elanus leucurus majusculus*), yellow warbler (*Dendroica petechia brewsteri*), yellow-breasted chat (*Icteria virens*), California (western) mastiff bat (*Eumops perotis californicus*), western red bat (*Lasiurus blossevillei*), and southern mule deer (*Odocoileus hemionus fuliginata*).

Nonlisted special-status species with potential to occur in the BSA, but not detected during historic 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 F and are not addressed further in this EIR/EIS.

Nonlisted Migratory/Wintering Shorebirds

Nonlisted migratory/wintering shorebirds are not currently endangered or threatened species, but are protected under the MBTA. In addition, San Elijo Lagoon and other lagoons and estuaries of San Diego County are within the boundary of the Southern Pacific Shorebird Region, included in the Southern Pacific Shorebird Conservation Plan, which is one of 11 regional plans associated with the U.S. Shorebird Conservation Plan (Hickey et al. 2003). This region supports more than 20 species of shorebirds, most of which have been documented during monthly bird counts that have been conducted for over 25 years at San Elijo Lagoon by professional biologists and volunteers. Although most shorebird species do not breed within the region, they do spend most of the year here. The Southern Pacific Shorebird Region is an important wintering area for shorebirds that breed in the arctic and temperate zones. The region also is important during migration, particularly for arctic-breeding species. Numbers of these shorebirds swell during migration periods, which, for all species combined, extend primarily from mid-March to mid-May in spring and from mid-June until at least November in autumn (Hickey et al. 2003). Shorebirds spend the majority of the year utilizing unvegetated tidal mudflats and beaches to forage and roost throughout the region.

The loss and/or degradation of shorebird habitat throughout the region and San Diego County is from a variety of factors, including human-created habitats, human alterations to watersheds, and introduction of marsh plants, which threaten to reduce prime foraging habitat of unvegetated tidal flats.

Wildlife Corridors/Connectivity

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). 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 temporal and spatial scales. 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. 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. A wildlife movement study was not conducted

within the project area; however, the area is important to local wildlife movement. In general, wildlife species are likely to use habitat within the project area 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. San Elijo Lagoon is not functioning as a regional corridor. Instead, it is a large area of natural open space connected to Escondido Creek. Escondido Creek links San Elijo Lagoon with other open space habitat in Harmony Grove and the Elfin Forest to the northeast. San Elijo Lagoon is important in that it provides a large area of habitat for core populations of sensitive wildlife and plant species.

Materials Disposal/Reuse Study Area

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

The majority of the placement sites, with the exception of LA-5, were analyzed as receiver sites under the EIR/EA for the 2012 RBSP (SANDAG 2011); therefore, the biological conditions described for the 2012 RBSP have been considered (and updated as appropriate) in the Marine Biological Technical Report (Appendix H) for these sites and are summarized below. LA-5 was analyzed in the EIS for LA-5 (EPA 1987); therefore, the biological conditions described in the EIS for LA-5 are summarized below. Each of the seven proposed placement sites is described in terms of habitat and species identified within its boundaries (i.e., footprint) as well as nearby sensitive resources. 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. Generally, sandy 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. The site assessment considers the potential for suitability to change during the course of the grunion spawning season, which primarily ranges from March through August, due to natural seasonal sand level changes on beaches.

On Shore Placement Sites

Habitat within Placement Site Boundaries

Beach

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

Cardiff: The Cardiff placement site is broken into two areas, Cardiff-beach and Cardiff-nearshore. Cardiff-beach contains beach habitat that is predominantly sandy with variable cobble, ranging from sparse to localized areas of dense cobble. Sand depths during the November 2008 survey completed for the 2012 RBSP averaged 16 to 18 inches in the upper and middle tide zones and 35 inches in the lower intertidal. Beach widths above the high tide zone ranged from 0 to 1.7 feet. Within the placement site, kelp and surfgrass wrack was sparse and localized on the beach. Riprap shore protection occurred along most of the site; the wetted sand line indicated wave run-up to the revetment. Sand erosion was visible after the January 2010 storm with greater beach slope and concentrations of cobbles (SANDAG 2011). This location received approximately 89,000 cy of sand from the 2012 RBSP in fall 2012. By mid-winter 2013, much of the material had dispersed downcoast from the original receiver site footprint.

Moonlight: Beach habitat is predominantly sandy with sparse cobble throughout the tide zones. Sand depths during the July 2009 survey completed for the 2012 RBSP averaged 22 to 29 inches across tide zones. No vegetation wrack was on the beach. Sand erosion was visible after the January 2010 storm with greater beach slope, concentrations of cobbles, and exposure of substantial sandstone in the swash zone seaward of the upcoast half of the site. The sandstone was unvegetated, indicating recent scour. This location received approximately 92,000 cy of sand from the 2012 RBSP in fall 2012. By mid-winter 2013, much of the material had dispersed downcoast from the original receiver site footprint.

Leucadia: Beach habitat is sandy within the boundaries of the placement site. Sand depths averaged between 19 and 25 inches across tide zones during the July 2009 survey completed for the 2012 RBSP. Kelp and surfgrass wrack was sparse on the beach. This location did not receive material from the 2012 RBSP; however, the Batiquitos site, which is upcoast of the Leucadia site, received approximately 108,000 cy of sand from that project in fall 2012. By mid-winter 2013, much of the Batiquitos material had dispersed downcoast to Leucadia.

Solana Beach: Beach habitat is predominantly sandy with sparse cobble. Sand depths during the November 2008 survey completed for the 2012 RBSP averaged 20 to 28 inches across tide zones. The July 2009 survey indicated greater variability in sand depths, ranging from 17 inches in the upper intertidal to 27 inches in the lower intertidal. Beach widths above the high tide zone were narrow and ranged from 0 to 1.7 feet. Kelp and surfgrass wrack was sparse and localized on the beach). This location received approximately 142,000 cy of sand from the 2012 RBSP in fall 2012. Much of that material had dispersed downcoast from the original receiver site footprint by mid-winter 2013.

Torrey Pines: Beach habitat is predominantly sandy with sparse cobble throughout the tide zones. Sand depths during the November 2008 survey completed for the 2012 RBSP averaged from 20 to 30 inches across tide zones. Beach widths above the spring high tide line ranged from 0 to 5 feet. Kelp and surfgrass wrack was sparse and localized on the beach. After the January 2010 storm, sand erosion was visible along the bluff and increased cobble cover. Scoured sandstone without marine life was exposed in the lower intertidal. This location did not receive material as part of the 2012 RBSP.

Reefs

The Cardiff-nearshore placement site includes a portion of an outfall pipeline covered with riprap that supports localized occurrence of hard-bottom reef species such as giant kelp, feather boa kelp, sea palm, and sea fans. No other vegetated reef habitats occur within the Encinitas-Moonlight, Solana Beach, Leucadia, or Torrey Pines placement site footprints.

Nearby Sensitive Resources

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

Cardiff: The onshore Cardiff placement site is located approximately 1,000 feet from intertidal surfgrass, sensitive hard-bottom, and vegetated habitats (i.e., kelp beds and understory of algae).

Encinitas-Moonlight: Habitat directly offshore is primarily sand with sparse cobble and rocks mainly vegetated with turf algae. Sparse surfgrass has historically been mapped offshore and may occur (MEC 2000); however, the 2002 Nearshore Program did not identify any. Substantial reef with understory algae and subtidal surfgrass occurs approximately 400 to 500 feet, respectively, offshore and upcoast of the northern boundary of the site. Sensitive hard-bottom habitat is located 330 feet from the site, while

intertidal surfgrass is approximately 3,000 feet. Kelp beds were mapped approximately 850 feet offshore.

Solana Beach: Intertidal surfgrass habitat occurs 2,400 feet from the site. Sensitive subtidal hard-bottom and vegetated habitats occur approximately 480 feet from the site, while sensitive hard-bottom areas are located approximately 240 feet offshore.

Leucadia: Intertidal and subtidal surfgrass and hard-bottom habitat is located approximately 150 feet from the placement site. Surfgrass was observed on low-relief rock in the minus tide zone seaward of the site boundaries during the June 2009 and January 2010 site visits completed for the 2012 RBSP. Nearshore reef understory algae begins approximately 150 feet seaward and extends farther offshore of the proposed placement site boundaries. Kelp bed habitat was mapped approximately 1,000 feet offshore of the southern portion of the site in 2008.

Torrey Pines: Intertidal and subtidal surfgrass habitat occurs 200 feet offshore, while hard-bottom habitat occurs 150 feet offshore from the site. Nearshore reefs with understory algae are located approximately 1,000 feet downcoast and 1,400 feet upcoast of the site. Kelp bed habitat is nearly 1 mile from the site.

Critical Habitat

USFWS-designated critical habitat for the threatened western snowy plover occurs approximately 1,000 feet away from the Cardiff placement site, within the west basin of San Elijo Lagoon, as described above and shown in Figure 3.6-3. In addition, USFWS-designated critical habitat for threatened western snowy plover occurs approximately 1,400 feet upcoast of the Torrey Pines placement site.

No critical habitat exists within or in proximity to the Encinitas-Moonlight, Solana Beach, and Leucadia 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 Pacific Ocean (adjacent to placement sites) is designated as EFH for Pacific Groundfish and Coastal Pelagic species.

Rare, Threatened, or Endangered Species

Federally Listed Species

The following sites are located more than 1 mile from least tern and western snowy plover nesting sites (Table 3.6-4): Encinitas-Moonlight, Cardiff, Solana Beach, and Torrey Pines. The Leucadia placement site is located at distances less than 1 mile from nesting sites.

Table 3.6-4
Estimated Closest Distances to Least Tern and Western Snowy Plover Nesting Sites

Placement Sites	Nearest Nest Site*	Miles
Leucadia	Batiquitos	0.8 mi
Encinitas-Moonlight	Batiquitos	2.6 mi
Cardiff	San Elijo (historical)	1.1 mi
Cardiff	San Dieguito (new)	3.2 mi
Solana Beach	San Dieguito (new)	1.3 mi
Torrey Pines	Los Peñasquitos (historical)	0.2 mi
Torrey Pines	San Dieguito (new)	2.3 mi

*Active nesting within last 5 years except at historical and new sites.

mi = mile(s)

Grunion

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

Prior to the 2012 RBSP, both the Solana Beach and Torrey Pines placement sites had limited spawning habitat for grunion due to narrow beach widths, unlike the Cardiff, Moonlight, and Leucadia placement sites that supported potentially suitable spawning habitat for grunion. Observations suggest that those sites that received sand from the 2012 RBSP may continue to provide grunion spawning habitat through the 2014 season and perhaps longer. This suggests Torrey Pines may still have limited spawning habitat. Observations from the 2001 RBSP indicated grunion spawning habitat was enhanced for up to 5 years at some locations.

Offshore Stockpiling Sites (SO-5/SO-6)

Overview of Site and Adjacent Locations

Both SO-5 and SO-6 consist of sandy bottom habitat with no vegetated reef habitat. No critical habitat exists within, or in proximity to, these sites and no federally or state-listed species were identified within SO-5 and SO-6.

SO-5 is located 1,000 feet or more from nearshore reefs at depths less than -30 feet and approximately 600 feet from kelp canopy mapped in 2008. SO-6 is more than 500 feet from substrate supporting kelp canopy mapped in 2008. The San Elijo wastewater discharge pipeline is located more than 500 feet upcoast. The closest nearshore reefs at depths less than -30 feet are located approximately 1,400 feet away. Proposed pipeline and monobuoy locations have the potential to be near vegetated reef, kelp habitats, and the pipeline at Cardiff.

Overview of Marine Resources

The entire Pacific Ocean is designated as EFH for Pacific Groundfish and Coastal Pelagic species. Kelp bass (*Paralabrax clathratus*) is managed as a game species by CDFW. During the 2009 survey for the 2012 RBSP, this fish species was observed within SO-5 and SO-6.

Sea turtles

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 are expected to migrate through and forage within and near the sites.

Marine Mammals

Marine mammals are protected by the Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972. Harbor seals and California sea lions are common in inshore coastal water off southern California and have the potential to occur within this offshore stockpile site. The California gray whale migrates along the southern California coast between summer feeding grounds in the Bering Sea and winter calving grounds in Baja California.

Marine mammals and turtles may be in the general vicinity of dredge and transit vessels during materials placement activities.

3.6.2 CEQA THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis, the following applicable thresholds of significance have been used to determine whether implementing the proposed project would result in a significant impact. These thresholds of significance are based on Appendix G of the CEQA Guidelines, County of San Biological Resources Diego Guidelines for Determining Significance (County of San Diego 2010), and criteria developed in previous beach sand projects. These additional criteria were included to provide additional context for evaluating impacts to the unique biological resources of lagoon ecosystems as a result of restoration/enhancement activities. A significant impact related to biological resources would occur if implementation of the proposed project would result in the following:

Sensitive Riparian and Natural Vegetation Communities

- A. The project would have a substantial adverse effect on riparian habitat or another sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.

All habitats within the San Elijo Lagoon BSA, as well as aquatic habitats (high-relief reefs and vegetated low-relief reefs), that may be located offshore of the sand placement 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 for more than 12 months, 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 San Elijo Lagoon, as described in more detail in the Sensitive Species section below (Chambers Group 2001).

In addition to sensitive habitat communities, specially designated habitats must also be considered, including USFWS critical habitat and EFH. For the purposes of this project, a permanent loss or substantial degradation of critical habitat would be considered significant.

Impacts to EFH are typically determined based on whether a project reduces quality and/or quantity of EFH, regardless of the degree to which that impact occurs. Based on the Magnuson-Stevens Act, adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species,

and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. By definition, the NOAA threshold to have an adverse impact to EFH is low; however, the nature of the impact can be further qualified based on the type of impact (e.g., temporary or permanent) and whether that impact is substantial based on best professional judgment. Therefore, this section refers to impacts to EFH in terms of compliance with the Magnuson-Stevens Act, as well as whether a significant or substantially adverse impact to EFH would occur, per CEQA/NEPA (Appendix H).

Wetlands

- B. The project would have a substantial adverse effect on local, state, and federally protected wetlands/waters.

The majority of San Elijo Lagoon is considered a jurisdictional water/wetland by the Corps, CDFW, RWQCB, and County of San Diego. For the purpose of this project, a substantial adverse effect on a federally protected wetland would include a permanent loss of wetlands 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 and Aquatic Sediment Quality and are not addressed herein.

Sensitive Species

- C. Have a substantial adverse effect, either directly or through habitat modifications, on a candidate, sensitive, or special-status species listed in local or regional plans, policies, or regulations, or by CDFW or USFWS or the population or habitat of rare, threatened, or endangered species or species of special concern.

For the purposes of this project, the term “substantial” is defined as a temporary or permanent change that would cause a decline in the local population of a species to below self-sustaining levels within San Elijo 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 direct 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 San Elijo Lagoon population (Chambers Group 2001). The 50 percent threshold has been chosen based on previous environmental impact evaluation for another large lagoon restoration project, Bolsa Chica Restoration Project, and best professional judgment (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 SELRP 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. Have a substantial adverse effect on the movement of a native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

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 temporary or permanent features that would impede wildlife movement through a local or regional wildlife corridor.

Local Ordinances, Policies, Adopted Plans

- E. Conflict with one or more local policies or ordinances protecting biological resources and/or conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

For the purposes of this project, an inconsistency with goals of SANDAG's Multiple Habitat Conservation Plan (MHCP) encompassing the cities of Encinitas and Solana Beach, and draft County of San Diego North County Multiple Species Conservation Program (North County MSCP), another subregional conservation planning effort, would be considered potentially significant.

3.6.3 ENVIRONMENTAL CONSEQUENCES

Potential direct and indirect impacts on biological resources would result from the SELRP. Most would be related to construction, but there would be habitat changes and impacts associated with the restored condition as well. This section evaluates direct and indirect impacts, as well as permanent and temporary impacts to biological resources.

This EIR/EIS analyzes the effects from both construction and post-construction to biological resources associated with the four restoration alternatives. Effects are evaluated within the project boundary. Due to the nature of the project, no additional buffer area is included. Effects may be negative (adverse or significant) or positive and are both discussed within this section.

Especially relevant to the significance determination under CEQA is the effect and severity of the impact on regulated or otherwise protected biological resources, specifically, jurisdictional waters, federally listed (threatened or endangered) or candidate species and the habitats they occupy, and migratory birds covered under the Migratory Bird Treaty Act (MBTA).

Lagoon Restoration

The following section discusses each of the four restoration alternatives and their potential to affect biological resources within the San Elijo Lagoon BSA.

Alternative 2A

Sensitive Riparian and Natural Vegetation Communities

The proposed SELRP would result in short-term and long-term changes to sensitive vegetation communities. Short-term changes would result from project construction and direct impacts to vegetation from grading, dredging, and project construction (Figure 3.6-9). Directly following construction, restoration (both active and passive) would occur in temporarily impacted areas (i.e., grading/dredging footprint). Restoration would represent long-term change to sensitive vegetation communities, as a result of the new habitat distribution associated with the modified elevation and tidal regime. These long-term changes would occur 5–10 years post-restoration, as vegetation in the lagoon becomes reestablished at the new elevations/grade. These anticipated changes to sensitive vegetation within the lagoon are described in detail below.

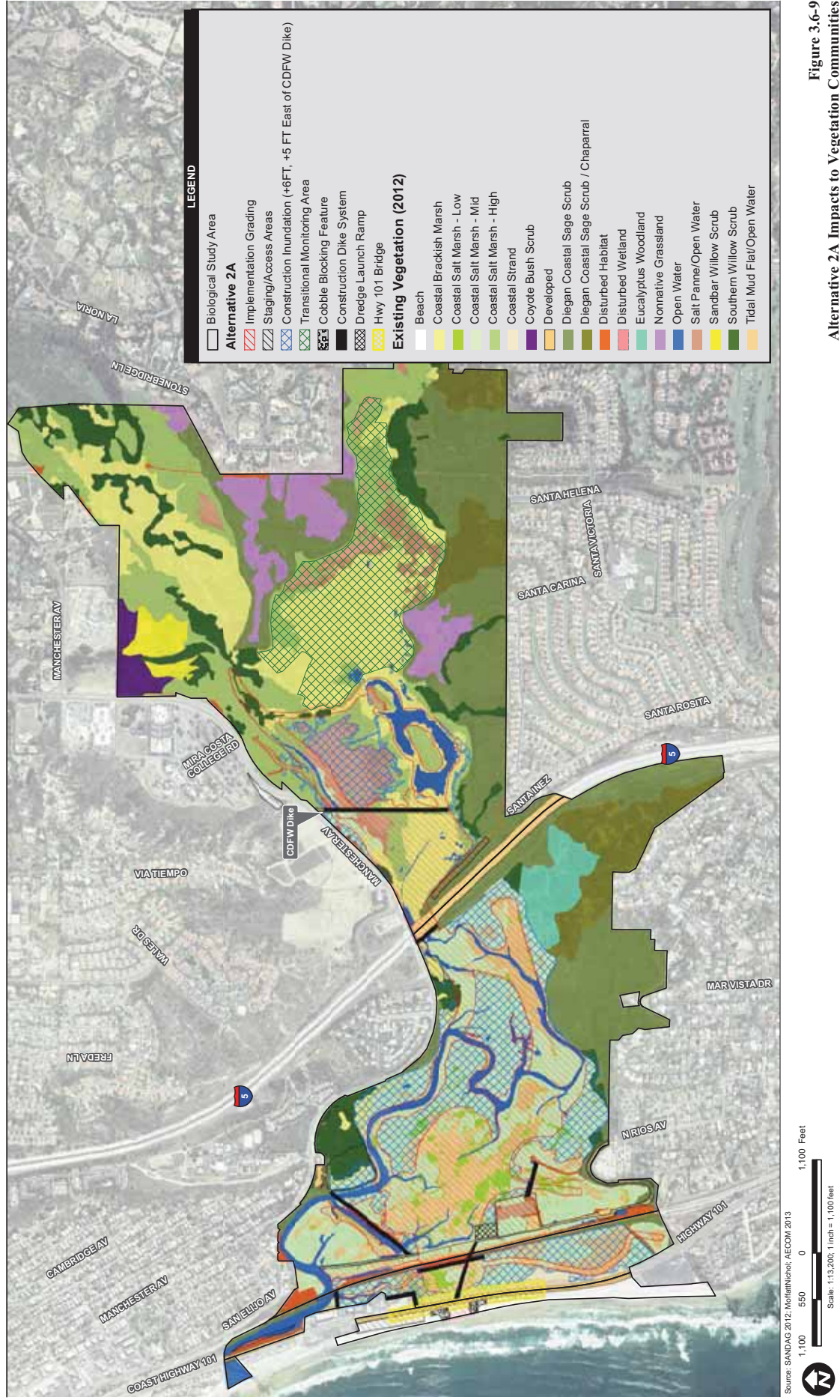
Short-term/Temporary

Construction of Alternative 2A would result in temporary impacts to sensitive habitats associated with grading and dredging operations (Figure 3.6-9), as well as from extended inundation. The project is anticipated to take approximately 3 years to construct and would be phased to minimize impacts to lagoon habitats, allowing for refuge for species and retaining some habitat areas at any given time during construction. Phasing includes limitations on the overall duration of time a lagoon basin would be impacted, as well as limitations on the overall inundation and construction area within a given basin. Inundation would allow for dredging of

channels within each basin. As described in Chapter 2, inundation durations were minimized to the extent practicable and vary by lagoon basin (west, central, or east) (see Section 2.10.15 Project Design Features). Wet construction methods have been identified to the extent possible to minimize additional impacts associated with dry construction approaches in wetlands. Limits on inundation have been placed to minimize impacts due to flooding, including limiting the initiation of habitat flooding to outside the breeding season (PDF-17), utilizing flooding to flush birds where possible prior to clearing and grubbing (PDF-19), and clearing and grubbing within flooded areas or utilizing a biological monitor to flush wildlife (PDF-18). Impacts are summarized in Table 3.6-5 and are separated into two types of short-term impacts: areas that would be graded/dredged during construction, and areas that would be affected by inundation only. A complete breakdown of impacts by basin is provided in the BTR included in Appendix F.

Alternative 2A would result in temporary impacts to 32 percent of San Elijo Lagoon. Grading/dredging impacts would occur to approximately 198 acres (approximately 20 percent) of habitat and inundation would impact an additional 110 acres (approximately 12 percent) of habitat within the San Elijo Lagoon BSA (Figure 3.6-9). The extensive hillsides along the lagoon and the eastern end of the BSA would not be impacted by restoration construction.

The primary concern for temporal loss of habitat is reduced availability of food and shelter for resident and migratory species that rely on the lagoon. As noted above (Section 3.6.2), temporary impacts to sensitive habitats were considered significant if more than 50 percent of a sensitive habitat within the lagoon would be lost temporarily. Vegetation that would be inundated, but not graded or otherwise altered, may survive the extended inundation periods, but there is insufficient verifiable data to make an accurate conclusion as to how much of the vegetation would be expected to survive. Because areas would be inundated for 3 months or longer, it is assumed that inundated vegetation would not survive as a worst-case scenario. The adaptive management program for the project, as described in Chapter 2.11, includes measures for monitoring and maintenance activities to aid in the recovery of inundated vegetation communities. Further, a conceptual restoration plan has been prepared and is included in Appendix Q.



Source: SANDAG 2012; Moffatt/Notch, AECOM 2013

1,100 550 0 1,100 Feet

Scale: 1:13,200; 1 inch = 1,100 feet

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**Table 3.6-5
Direct Project Impacts from Construction of Alternative 2A**

Basin/Habitat Community	Existing Vegetation (acres) within the BSA	Alternative 2A Direct Impacts from Dredging/Grading (acres)	Alternative 2A Direct Impacts from Inundation	Habitat Temporarily Impacted (% in BSA)
Beach	15.0	4.9	0	33%
Coastal Brackish Marsh	131.5	23.7	4.3	21%
Coastal Salt Marsh – High	120.0	12.6	3.2	13%
Coastal Salt Marsh – Low	13.3	10.2	2.4	95%
Coastal Salt Marsh – Mid	141.4	55.4	64.0	84%
Coastal Strand	5.0	1.2	1.1	46%
Coyote Bush Scrub	7.5	0	0	0%
Developed	23.4	7.3	0.1	32%
Diegan Coastal Sage Scrub	178.2	2.5	1.0	2%
Diegan Coastal Sage Scrub/Chaparral	49.3	0	0.0	0%
Disturbed Wetland	1.1	0	0	0%
Disturbed Habitat	11.9	3.4	0.6	34%
Eucalyptus Woodland	19.1	0	0.1	1%
Nonnative Grassland	33.1	0	0	0%
Open Water	40.1	25.7	2.4	70%
Salt Panne/Open Water	37.0	6.6	13.7	55%
Sandbar Willow Scrub	8.9	0	0	0%
Southern Willow Scrub	61.3	2.6	2.3	8%
Tidal Mud Flat/Open Water	63.1	42.6	15.1	91%
Grand Total	960.2	197.8	110.6	32%

The duration in which vegetation may be temporarily lost would vary based on the basin, type of impact (dredged/graded or inundated), species tolerance to inundation, and recovery period. This length of impact may be as short as 6–12 months for habitats inundated in the west basin, due to the shorter duration of inundation (estimated at 3 months) and may be greater than 5 years for habitats that would be grubbed and graded during construction. As shown in Table 3.6-5, restoration construction would result in greater than 50 percent temporal loss of sensitive habitats that would be significantly impacted by construction, including coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats. The temporal loss of these habitats may threaten local populations of sensitive resident species, as described further in the Sensitive Species section below. **Short-term direct impacts to coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats are therefore considered significant under CEQA (Criterion A) and temporarily adverse under NEPA.**

Temporary impacts to beach, coastal brackish marsh, high coastal salt marsh, coastal strand, Diegan coastal sage scrub, and southern willow scrub are not considered significant because greater than 50 percent of the local habitat would remain available to local resident 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 (PDF-16). These areas would be monitored throughout construction by a qualified biologist (PDF-13). **Short-term direct impacts to beach, coastal brackish marsh, high coastal salt marsh, coastal strand, Diegan coastal sage scrub, and southern willow scrub are therefore considered less than significant and not substantially adverse (Criterion A).**

No direct impacts are proposed to coyote bush scrub, Diegan coastal sage scrub/chaparral, disturbed wetland, nonnative grassland, and sandbar willow scrub.

USFWS Critical Habitat

Temporary impacts to approximately 15 acres (three subunits) of USFWS critical habitat for western snowy plover containing PCEs 2 and 3 would occur as a result of construction. Although PCEs are not discretely mapped, each of these subunits has the potential to support one or more of the possible four PCEs for western snowy plover. Western snowy plover has not nested at the lagoon since 2005 and, as described above, the critical habitat is currently in a degraded state. However, as described in the Federal Rule, this habitat was designated with the expectation that the SELRP would improve the habitat for western snowy plover as a result of restoration (specifically the proposed nesting sites) in the long term. The Federal Register states that the restoration of degraded habitat within these three subunits would improve the habitat for western snowy plover (USFWS 2012b). The long-term monitoring and management program would include species-specific goals/actions to maintain critical habitat areas for western snowy plover. **Therefore, temporary impacts to western snowy plover critical habitat, for the purpose of restoration, are considered less than significant and not substantially adverse (Criterion A).**

Coastal California gnatcatcher critical habitat would primarily remain unimpacted during restoration construction. There are two small areas where critical habitat exists in the vicinity of project grading and inundation. A very small area of critical habitat is mapped in the vicinity of the existing access road proposed for improvements, and a second area is mapped along the I-5 berm where the bridge is proposed to be widened by the I-5 North Coast Corridor Project. In the area of the proposed access road, impacts to critical habitat would be avoided by remaining within the existing roadbed and disturbed areas, as noted in Chapter 2 in Section 2.10.15 Project Design Features. Impacts to critical habitat in the area of the I-5 North Coast Corridor Project were considered and mitigated as a part of that project's approved EIR and Biological Opinion (Caltrans 2012; USFWS 2012a). No additional impacts to gnatcatcher critical habitat would occur in this area. **Therefore, no new impacts to coastal California gnatcatcher critical habitat would occur as a result of this restoration project and impacts are considered less than significant and not substantially adverse (Criterion A).**

Essential Fish Habitat

Construction of Alternative 2A would result in temporary and short-term impacts to EFH associated with grading and dredging operations (e.g., excavation, turbidity, sediment disruption). The project would be phased, allowing for refuge and retaining available habitat at any given time during construction. In addition, the lagoon does not support rocky reefs or eelgrass habitat. Therefore, construction impacts would be limited to unvegetated soft-bottom habitat. **With construction phasing to maintain available habitat during construction, short-term impacts to EFH are considered less than significant and not substantially adverse (Criterion A).**

Indirect Impacts

Indirect short-term/temporary impacts to adjacent vegetation communities, particularly uplands, are anticipated to be minimal with the implementation of Alternative 2A. Water-based construction minimizes dust and noise impacts and no indirect loss of vegetation is anticipated. **No significant or adverse indirect impacts to vegetation communities are anticipated with the proposed project (Criterion A).**

Long-Term/Permanent

Long-term changes in vegetation (5–10 years post-restoration) would occur from implementation of Alternative 2A, as shown in Table 3.6-6 and Figure 2-3. Planting to facilitate recovery of habitat dredged or inundated would occur, but as described in the Short-Term Impact section above, it would take time before habitats are reestablished in the lagoon. Within 5–10 years following restoration, habitats are expected to have substantially recovered and matured. The overall acreage of sensitive habitats within the lagoon would remain approximately 960 acres. However, conversion from one sensitive vegetation community to another within the lagoon would occur with the dredging of channels/basins, grading, and improvements to hydrologic function.

Alternative 2A incorporates hydrologic modification in the form of a new inlet located in the middle of the west basin (Figure 2-3). In addition, a subtidal basin extending from the west basin into the central basin would connect to enlarged tidal channels extending north and east. Alternative 2A would also include creation of an extensive network of tidal channels in the east basin. The tidal connection between the central and east basins would be widened and deepened.

Table 3.6-6
San Elijo Lagoon Restoration Project
Post-Restoration Vegetation Summary (acres)
(difference from existing is shown in parentheses)

Habitat Description	Existing -2012	Alt 2A	Alt 1B	Alt 1A	No Project/No Federal Action
Avian Island	0	2 (+2)	2 (+2)	2 (+2)	0 (0)
Mudflat	63	102(+39)	71 (+8)	25 (-38)	29 (-34)
Low Marsh	13	23 (+10)	51 (+38)	44 (+31)	51 (+38)
Mid Marsh	141	124 (-17)	98 (-43)	140 (-1)	107 (-34)
High Marsh	120	107 (-13)	124 (+4)	145 (+25)	167 (+47)
Salt Panne	37	17 (-20)	30 (-7)	35 (-2)	37 (0)
Freshwater/Brackish Marsh	132	96 (-36)	99 (-33)	121 (-11)	131 (-1)
Open Water/Tidal Channels and Basins	40	74 (+34)	67 (+27)	34 (-6)	24 (-16)
Riparian	72	67 (-5)	67 (-5)	70 (-2)	71 (-1)
Coastal Strand	5	5 (0)	5 (+0)	5 (0)	5 (0)
Uplands & Others	299	292 (-7)	295 (-4)	299 (0)	299 (0)
Beach	15	14 (-1)	15 (0)	15 (0)	15 (0)
Berms and Roads	23	24 (+1)	24 (+1)	24 (+1)	23 (0)
Transitional (created)	0	12 (+12)	12 (+12)	2 (+2)	0 (0)
Total¹	960	960	0	960	0

¹ Totals may not sum due to rounding.

The primary change in habitat distributions under Alternative 2A would be an increase in subtidal habitat and mudflat within the lagoon compared to both existing conditions and the predicted No Project/No Federal Action conditions. Subtidal habitat would be increased in all three lagoon basins compared to existing conditions. Mudflat and mid-salt marsh habitats would increase due to conversion of salt panne, fresh/brackish marsh, open water/freshwater marsh, and habitats that currently occupy the transition zone.

Alternative 2A would facilitate efficient conveyance of seasonal freshwater flows through the subtidal basin and out through the new inlet. Freshwater flows could also be conveyed to the

ocean via the existing inlet if naturally breached. Alternative 2A would require a new bridge on Coast Highway 101 at the new inlet location and a new railroad bridge (proposed by others) to span the new inlet. Other infrastructure, such as CBFs, would be required to increase the stability of the new tidal inlet. An avian nesting area would be established in the central basin. A portion of the salt panne habitat in the far east basin would likely transition to salt marsh, limiting management options for avian nesting. The salt panne habitat that exists within the lagoon is a relic habitat that the SELRP anticipates retaining, although the location of the salt panne is not typical of natural salt panne habitat in other regional lagoons and estuaries. Currently, CDFW does not actively manage water levels east of the dike, although, in the past, gates within the dike were opened and closed seasonally. This alternative would remove the CDFW dike and increase hydraulic efficiency of the channel adjacent to the existing salt panne. A portion of the dike would be left in place west of the salt panne as transitional area. It is anticipated that the salt panne would continue to be inundated occasionally during high water flow conditions, although it may drain more quickly. Similar sequences of inundation, drainage, and evaporation would occur, enabling the continued existence of the habitat.

The overall acreage of habitat available for sensitive species would remain unchanged with this alternative, but benefits from the improved water quality and hydrologic function of the lagoon are expected. When considering changes to sensitive habitats, a change from one sensitive habitat to another does not necessarily represent a positive or negative impact. Rather, the ecological ramifications of the change on sensitive species and lagoon ecology would be the primary indicators of impact. As described in Chapter 1, existing lagoon habitat is rapidly converting, with continued loss of mudflat and rapid increase in low- and mid-salt marsh. Evidence of this rapid conversion is apparent in numerous surveys over time and in recent surveys conducted between 2010 and 2012. During the 2-year period between the 2010 and 2012 surveys, low- and mid-salt marsh habitat (dominated by cordgrass and pickleweed) increased by 13 acres and mudflats decreased by 12 acres. With rapid transition to salt marsh, there is a reduction in available foraging habitat for sensitive and nonsensitive birds, which has the potential for substantial ecological changes in the lagoon and is expected to dramatically change the habitat gradient and density of wildlife that the lagoon is able to continue to support. With implementation of Alternative 2A, the lagoon would experience improved water quality and hydrologic function and increased foraging habitat, and the rapid changes, occurring under existing conditions and projected to continue with the No Project/No Federal Action Alternative, would reverse. Species specific impacts associated with these changes are evaluated below. **With improved lagoon ecology, increased foraging for species, and no overall loss of lagoon resources, direct impacts to sensitive vegetation communities with implementation of Alternative 2A are considered less than significant and not substantially adverse (Criterion A).**

USFWS Critical Habitat

No long-term impacts to USFWS critical habitat are anticipated for western snowy plover. Western snowy plover habitat would be improved with the proposed construction of Alternative 2A, as described in the Sensitive Species section below. No long-term loss of critical habitat is anticipated with project restoration. No new or permanent impacts would occur to coastal California gnatcatcher critical habitat as a result of this project. Impacts associated with the I-5 North Coast Corridor Project would be mitigated via that project. **Therefore, long-term impacts to USFWS critical habitat are considered less than significant and not substantially adverse (Criterion A).**

Essential Fish Habitat

Construction of Alternative 2A would result in long-term beneficial impacts to EFH because it would create additional acreages of open water, tidal channels, and mudflat habitat, as well as enhance the conditions of existing subtidal habitat by increasing tidal influence within the lagoon. This additional habitat would support local fish populations and therefore would benefit EFH within the project area. **Therefore no long-term significant or substantially adverse impact to EFH is anticipated with implementation of Alternative 2A (Criterion A).**

Jurisdictional Waters and Wetlands

Short-term/Temporary

Construction of Alternative 2A would result in temporary or short-term direct impacts to jurisdictional waters and wetlands due to grading and dredging operations. Of the approximately 620 acres of jurisdictional area present in the BSA, 280 acres would be directly impacted by construction (172.5 acres from grading/dredging and 107.6 acres from inundation). These impacts would include the short-term loss of vegetation (described above), wildlife (described further below), and potential impacts to water quality associated with construction. As described in Section 3.4 Water and Aquatic Sediment Quality, several project design features have been incorporated to reduce temporary impacts on water quality within the lagoon. PDFs include, but are not limited to, use of a cutterhead dredge to avoid/minimize the generation of turbidity at the location of the dredge (PDF-27), compliance with the RWQCB Construction General Permit (see Table 3.4-3 for construction-phase BMPs), and water quality monitoring (PDF-53). Impacts to jurisdictional waters (short-term and long-term) are further addressed in the 404(b)(1) alternatives analysis attached as Appendix O, as required by the Corps. **Due to the temporary nature of the direct impacts, and with implementation of project design features and compliance with local requirements for BMPs, short-term impacts to jurisdictional waters**

and wetlands associated with restoration construction are considered less than significant and not substantially adverse (Criterion B).

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 are described under sensitive vegetation communities, and impacts to water quality are described in Section 3.4. **No significant or adverse indirect impacts to wetlands are anticipated with restoration implementation (Criterion B).**

Long-Term/Permanent

Prior to construction of Alternative 2A, approximately 620 acres of the 960-acre project site was delineated as jurisdictional waters and wetlands of the U.S. and state. Following construction of Alternative 2A, conversion from one wetland type to another would occur due to dredging of channels/basins, grading of estuarine habitats, and improvements to hydrologic function. Implementation of Alternative 2A would result in permanent impacts to 12 acres (2 percent) of the jurisdictional waters and wetlands within the BSA due to the construction of the transitional areas within the east and central basins. These created transitional areas are designed to be above the high tide line, and, as such, they are not expected to meet the three-parameter wetland definition and may not be considered a wetland water of the U.S. However, a portion of these created transitional areas would likely be considered waters of the state and would still provide many of the functions and values associated with the larger lagoon ecology. The remaining jurisdictional waters and wetlands within the lagoon would be enhanced with improved hydrologic conditions and increased diversity. For example, the existing CDFW dike in the east basin would be removed and replaced with channel connections, which would increase tidal influence by allowing for salt water input and freshwater output within the east basin. Alternative 2A may result in a small decrease in jurisdictional wetland acreage overall; however, the improvement to wetland conditions and functions, as described in more detail in the 404(b)(1) alternatives analysis, would more than offset this loss. **Therefore, no long-term significant or adverse impacts to jurisdictional waters and wetlands are anticipated with implementation of Alternative 2A (Criterion B).**

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 vegetation are described under sensitive vegetation communities, and impacts to water quality are described in Section

3.4. No significant or adverse indirect impacts to wetlands are anticipated with restoration implementation (Criterion B).

Sensitive Species

As described above, the proposed SELRP would result in short-term and long-term changes to vegetation communities that support various sensitive species. Short-term changes would result from project construction and direct impacts to flora and fauna from grading, dredging, and project construction. Long-term changes to sensitive species would occur 5–10 years post-restoration, as the lagoon conditions recover as a result of the modified hydrology and new elevations/grade.

Flora

No federally or state-listed rare, threatened or endangered plant species occur within the areas proposed for restoration. One federally listed plant species, Del Mar manzanita, and one state-listed species, Orcutt's goldenbush, occur in uplands habitat and would not be affected by the proposed project. Of the 20 nonlisted sensitive plant species detected within the project area, 19 occur outside of the proposed grading limits and maintenance activity areas and are not expected to be affected by the proposed project.

Approximately four individuals of southwestern spiny rush (CNPS List 4.2) are within the grading limits of Alternative 2A and would be directly impacted. However, this direct impact is not considered significant or adverse, due to the several hundred individuals scattered throughout the mid- and high-salt marsh habitats within the lagoon. The large population of southwestern spiny rush is expected to persist within the lagoon, as the majority of the mid- and high-salt marsh habitats would remain intact. **Therefore, no significant or substantially adverse impacts to sensitive plant populations are anticipated with construction of Alternative 2A (Criterion C).**

Fauna

Of the 94 special-status wildlife species that have potential to occur within the BSA, seven federally and/or state-listed species were detected during previous studies and are considered resident/breeding within the BSA. These include the federally listed coastal California gnatcatcher and western snowy plover; the federally and state-listed light-footed Ridgway's rail, California least tern, southwestern willow flycatcher, and least Bell's vireo; and the state-listed Belding's savannah sparrow. These seven bird species utilize different habitats within the lagoon and as such are expected to be influenced differently by the restoration project. Potential impacts

to nonlisted special-status species known to occur and possibly breed on-site are described in detail in the BTR (Appendix F). Within the EIR/EIS, the impacts to nonlisted special-status species are captured within the listed species discussion and impact analysis as the listed species cover broad geographic areas and habitats within the BSA (Appendix F). There is the potential for short-term/temporary effects as well as long-term/permanent effects associated with the implementation of Alternative 2A. These effects may be considered negative (impact) or positive (benefit); both are discussed below.

SHORT-TERM/TEMPORARY

DIRECT

Direct short-term/temporary effects may include the short-term loss of nesting and/or foraging habitat for sensitive species resulting from construction activities.

As part of the restoration effort, nesting and/or foraging habitat would be temporarily impacted during construction. These direct temporary impacts are summarized in Table 3.6-7 and are separated into two types of short-term impacts: areas that would be graded/dredged during construction, and areas that would be affected by controlled inundation only. Although both impacts are direct, the duration of the temporary impacts associated with inundation are less predictable as these vegetation communities are adapted to tolerate long periods of inundation. Professional experience in various lagoons including Tijuana Estuary, San Diego River, and Bolsa Chica has shown impacts to some salt marsh vegetation species after 8 weeks of inundation; others tolerate 3 months, while others may tolerate even longer periods (Nordby 2015). This evaluation assumes that more than 3 months of contiguous inundation would result in vegetation mortality. Phased construction across basins limits inundation duration and geographic extent, thereby reducing impacts to nongraded inundated areas as well as preserving some tidal and noninundated habitat areas. Construction would also restrict vegetation removal activities to outside of the nesting season. In addition, discrete locations have been identified where temporary dikes would be placed to limit inundation and allow for species refugia.

Both least Bell's vireo and southwestern willow flycatcher have been observed in low numbers (less than five in any given year) within the central and east basins, foraging primarily within the southern willow scrub habitat. Neither species has been documented to breed on-site although there is the potential that successful vireo breeding has occurred (Patton 2010, 2012a). Construction of Alternative 2A would directly impact 4.9 acres (8 percent) of the southern willow scrub riparian habitat within the lagoon as a result of grading and inundation (Table 3.6-7). Both least Bell's vireo and southwestern willow flycatcher are migratory birds, which

Table 3.6-7
Alternative 2A Impacts to Suitable Habitat for Listed Bird Species

Species	Habitat Suitability*	Habitat Type	Existing Habitat (acres)	Habitat Impacted by Grading		Habitat Impacted by Inundation		Total Direct Impact to Existing Habitat	
				Acres	Percent	Acres	Percent	Acres	Percent
light-footed Ridgway’s rail	Nesting/Foraging	Coastal Brackish Marsh	131.5	23.7	18%	4.3	3%	28.0	21%
		Coastal Salt Marsh – Low	13.3	10.1	76%	2.5	19%	12.6	95%
	Foraging	Total Nesting	144.8	33.8	23%	6.8	5%	40.6	28%
		Mudflats	63.1	42.6	68%	15.1	24%	57.7	91%
		Coastal Salt Marsh – Mid	141.4	55.5	39%	64.1	45%	119.6	85%
		Coastal Salt Marsh – High	120	12.6	11%	3.2	3%	15.8	13%
California least tern	Nesting	Total Foraging	324.5	110.7	34%	82.4	25%	193.1	60%
		Salt Panne	36.9	6.6	18%	13.7	37%	20.3	55%
		Coastal Strand	5	1.2	24%	1.1	22%	2.3	46%
		Nesting Area**	0	0	0%	0	0%	0.0	0%
		Total Nesting	41.9	7.8	19%	14.8	35%	22.6	54%
		Subtidal/Channels	40.1	25	62%	2.4	6%	27.4	68%
western snowy plover	Foraging	Beach	15	0	0%	0	0%	0.0	0%
		Total Foraging	55.1	25	45%	2.4	4%	27.4	50%
	Nesting	CDFW Dike	0.4	0.4	100%	0	0%	0.4	100%
		Salt Panne	36.9	6.6	18%	13.7	37%	20.3	55%
		Coastal Strand	5	1.2	24%	1.1	22%	2.3	46%
		Nesting Area**	0	0	0%	0	0%	0.0	0%
Foraging	Total Nesting	42.3	8.2	19%	14.8	35%	23.0	54%	
	Mudflats	63.1	42.6	68%	15.1	24%	57.7	91%	
	Foraging	Beach	15	0	0%	0	0%	0.0	0%
		Total Foraging	78.1	42.6	55%	15.1	19%	57.7	74%

Species	Habitat Suitability*	Habitat Type	Existing Habitat (acres)	Habitat Impacted by Grading		Habitat Impacted by Inundation		Total Direct Impact to Existing Habitat	
				Acres	Percent	Acres	Percent	Acres	Percent
coastal California gnatcatcher	Nesting/Foraging	Diegan Coastal Sage Scrub	178.1	2.54	1%	1	1%	3.5	2%
		Diegan Coastal Sage Scrub/Chaparral	49.3	0	0%	0.03	0%	0.0	0%
		Coyote Bush Scrub	7.5	0	0%	0	0%	0.0	0%
		Total Nesting/Foraging	234.9	2.54	1%	1.03	0%	3.6	2%
least Bell's vireo	Nesting/Foraging	Sandbar Willow Scrub	9	0	0%	0	0%	0.0	0%
		Southern Willow Scrub	61.4	2.6	4%	2.3	4%	4.9	8%
		Total Nesting/Foraging	70.4	2.6	4%	2.3	3%	4.9	7%
		Southern Willow Scrub	61.4	2.6	4%	2.3	4%	4.9	8%
southwestern willow flycatcher	Nesting/Foraging	Total Nesting/Foraging	61.4	2.6	4%	2.3	4%	4.9	8%
		Coastal Salt Marsh – Mid	141.4	55.5	39%	64.1	45%	119.6	85%
		Coastal Salt Marsh – High	120	12.6	11%	3.2	3%	15.8	13%
		Total Nesting	261.4	68.1	26%	67.3	26%	135.4	52%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – Low	13.3	10.1	76%	2.5	19%	12.6	95%
		Total Foraging	13.3	10.1	76%	2.5	19%	12.6	95%

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as “foraging” is not expected to support breeding activities.

**Under existing conditions a portion of the nesting area is classified as salt panne.

means these species only occur in San Elijo Lagoon during a portion of the year (i.e., spring and summer months). As vegetation would be removed outside of the breeding season and both species use the site primarily for foraging during summer months, the short-term impact to 8 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. **Therefore, short-term direct impacts to least Bell's vireo and southwestern willow flycatcher would be less than significant and not substantially adverse (Criterion C).**

Construction of Alternative 2A would directly impact 3.5 acres (2 percent) of the coastal sage scrub habitat within the lagoon as a result of grading and inundation (Table 3.6-7). Coastal California gnatcatcher has been observed along the periphery of San Elijo Lagoon within sage scrub and chaparral habitats. As part of construction, an access road along the southwest corner of the central basin would need to be enhanced (widened) to accommodate construction vehicular traffic. All enhancements to the access road are expected to be contained within the existing footprint. However, as gnatcatchers have been observed adjacent to the road, there is the potential for short-term direct impacts. In addition to the access road, construction vehicles would need to temporarily access the created transitional area to deposit material to the north of the access road. As such, brush clearing may be needed along the small eastern footpath, to a width of approximately 12 feet, as well as minor grading to fill holes. There is the potential to impact nesting and foraging coastal California gnatcatchers during vegetation removal. To avoid this potential short-term direct impact, the project has included a project design feature that limits vegetation clearing to outside of the bird nesting season (PDF-12). Outside the nesting season, resident gnatcatchers may be present in the area. However, due to their high mobility, clearing vegetation out of the breeding season, coupled with the presence of a bird monitor (PDF-13) who would observe vegetation removal and stop work if needed, short-term direct impacts to coastal California gnatcatcher associated with vegetation clearing would be avoided. Impacts associated with vegetation clearing (3.5 acres) are not considered substantial and would not result in a decline in the local population below self-sustaining levels. **Therefore, short-term direct impacts to coastal California gnatcatcher are considered less than significant and not substantially adverse (Criterion C).**

Both California least tern and western snowy plover are documented annually foraging and roosting at San Elijo Lagoon, but neither is known to breed in the lagoon. Foraging nonlisted special-status species are discussed in the BTR (Appendix F). The western snowy plover forages on mudflats and beach habitats while the least tern utilizes subtidal channels and open water within the lagoon. Impacts to foraging habitat for both species would occur during construction with 4.9 (33 percent) acres of beach, 27.4 (68 percent) acres of open water/tidal channels, and 57.7 acres (91 percent) of mudflat disturbed as a result of grading and controlled inundation for Alternative 2A. A total of 27.4 acres (50 percent) of California least tern and 57.7 acres (74

percent) of western snowy plover suitable foraging habitat would be impacted as a result of construction for Alternative 2A. All impacts to foraging habitat would be phased across the three lagoon basins, and within each basin (i.e., daily dredging focused in a small area), so that large contiguous areas of foraging habitat would remain at any given time. 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 substantial adverse effect on these species. In addition, many of these areas post-restoration are expected to return to the same habitat type but with improved conditions as a result of improved hydrology. Although short-term impacts to foraging habitat would occur, short-term benefits are also expected. Sediment-dwelling organisms would be released into the water column during dredging, which may improve foraging efficiency for diving birds such as the least tern. The benthic community that resides in the mudflats would be temporarily impacted; recovery time for these communities is highly variable with location and environmental conditions but is anticipated to be relatively rapid. Soils within proposed mudflat areas would be native soils lowered slightly in elevation, or soils slurried from shallow excavation of the lagoon basins, and placed on the sand cap on the overdredge pit in the central basin. In both cases, the exposed mudflat soils would consist of native marsh soils that contain native infauna that would facilitate recovery. The recovery of the benthic community would be monitored as part of the monitoring and maintenance program. The relatively quick recovery time coupled with improved tidal hydrology and water quality is expected to enhance the benthic community within the lagoon and in particular the mudflats. The improved conditions would result in higher productivity in the restored mudflats and direct benefits to birds that forage on them, such as the western snowy plover. Similarly, the improved hydrologic and water quality conditions are expected to have a positive effect on the fish community, which is the primary food of California least tern. **Therefore, short-term direct impacts to western snowy plover and California least tern are considered less than significant and not substantially adverse (Criterion C).**

Belding's savannah sparrow occupy mid- and high-marsh habitat throughout San Elijo Lagoon but are particularly dense in the central basin and western portion of the east basin where pickleweed-dominated mid-marsh habitat is prevalent. As a result of dredging and controlled inundation, Alternative 2A would temporarily impact 119.6 acres (85 percent) of mid-marsh and 15.8 acres (13 percent) of high-marsh habitat across the three basins (BTR; Table 3.6-7, and Figure 3.6-10). As a result of construction for Alternative 2A, 135.4 acres out of 261.4 acres (52 percent) of suitable nesting habitat for Belding's savannah sparrow would be impacted. 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 restoration as they do to seasonal variability by shifting and contracting their territory size to accommodate the new

acreage available. The project would minimize impacts by removing vegetation outside of the breeding season to avoid direct impacts to Belding's savannah sparrow and to allow the birds time to establish new breeding territories in unimpacted habitat. In addition, the project has included the creation of dry and noninundated refugia during Phase 1 and Phase 2 to maximize the potential breeding habitat available during construction. Finally, the project includes a habitat enhancement plan as a design feature that would be developed and implemented prior to and during construction to enhance target locations of unimpacted suitable habitat for Belding's savannah sparrow (PDF-21). The habitat enhancement plan would allow for refugia during construction, when suitable breeding and foraging habitat areas would be reduced. The plan would include measures such as removal of perches that competitor birds (song sparrow) use, removal of non-pickleweed vegetation, and predator control. Belding's savannah sparrow is a year-round resident and project construction would result in the temporary loss of greater than 50 percent of their nesting habitat (mid- and high-salt marsh). This temporary construction impact is considered a significant impact to the local population. **As such, Alternative 2A would have a significant and adverse short-term direct impact on Belding's savannah sparrow (Criterion C).**

Light-footed Ridgway's rails are year-round residents in the lagoon nesting in low-marsh and coastal brackish marsh habitat. Alternative 2A would directly impact 40.6 acres (28 percent) of existing suitable nesting habitat through both direct grading and controlled inundation (Table 3.6-7 and Figure 3.6-11). These direct impacts would affect both the low-marsh and brackish marsh habitat that supports this species. The project has proposed design features to minimize impacts to wildlife (birds in particular) that would be associated with dredging and other earth work. Project design features include the removal of vegetation, and initiation of flooding, outside of the bird breeding season to avoid direct impacts to species and to allow the birds time to establish new breeding territories in unimpacted habitat (PDF-12 and PDF-17). In addition, dry and tidal refugia have been included in the project to provide continued breeding opportunities for the species. These wildlife refugia are focused on the west basin and the western portion of the central basin where the light-footed Ridgway's rail population is smallest (two pairs in 2013) and as such can likely accommodate those individuals. The remaining population (18 pairs) is focused in the eastern basin within the brackish marsh, with most of the 2013 observations occurring east of the grading and controlled inundation limits. The project also includes a design feature to implement a habitat enhancement plan (PDF-21) prior to and during construction to enhance target locations of unimpacted habitat that may be suitable for light-footed Ridgway's rail. The habitat enhancement plan would allow for additional refugia during construction when suitable habitat areas would be reduced. The plan would include things such as nesting platforms, focused cordgrass plantings, and fencing to increase protection from predators and people, as well as select predator control. In addition to direct impacts associated

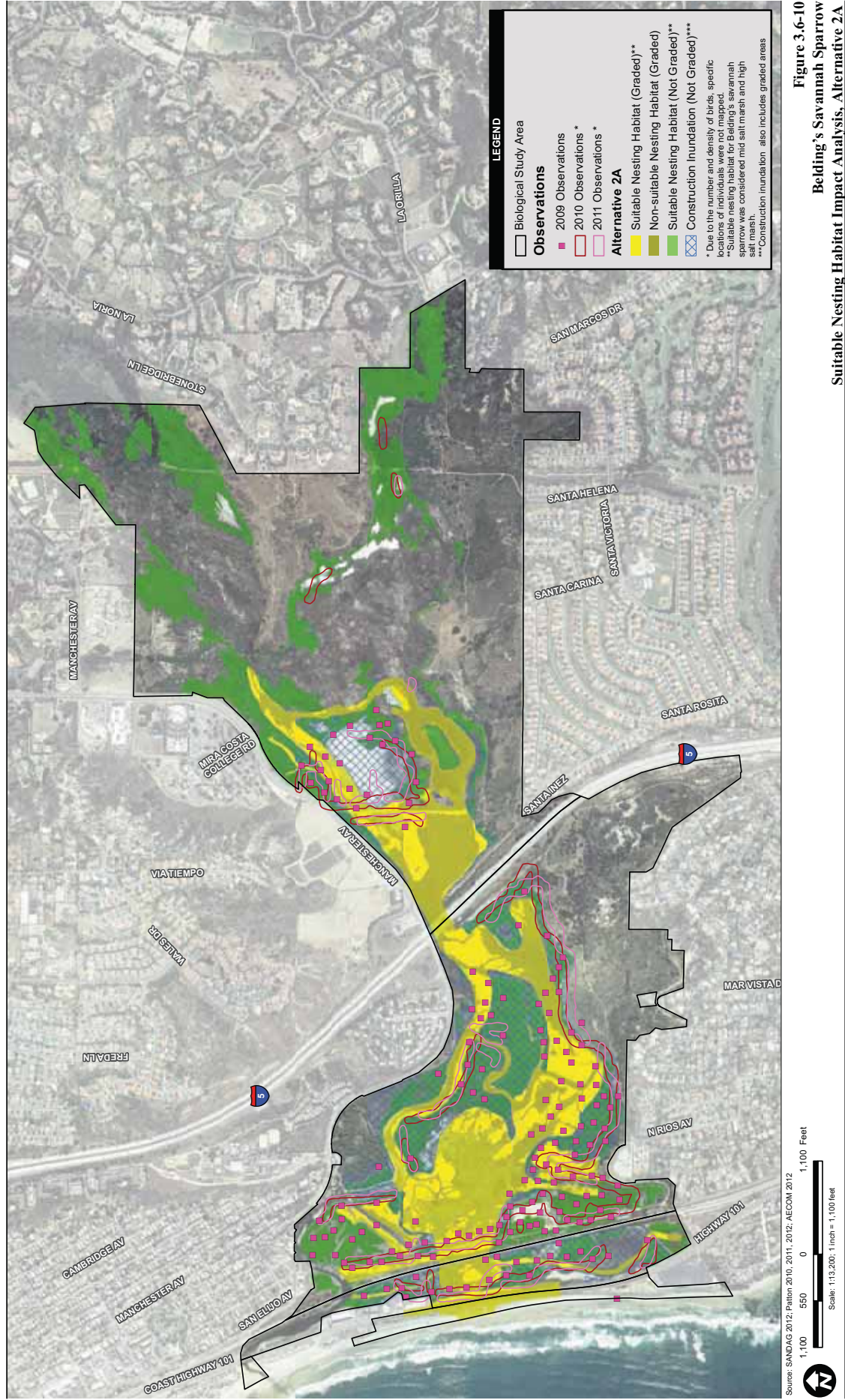


Figure 3.6-10
Belding's Savannah Sparrow
Suitable Nesting Habitat Impact Analysis, Alternative 2A

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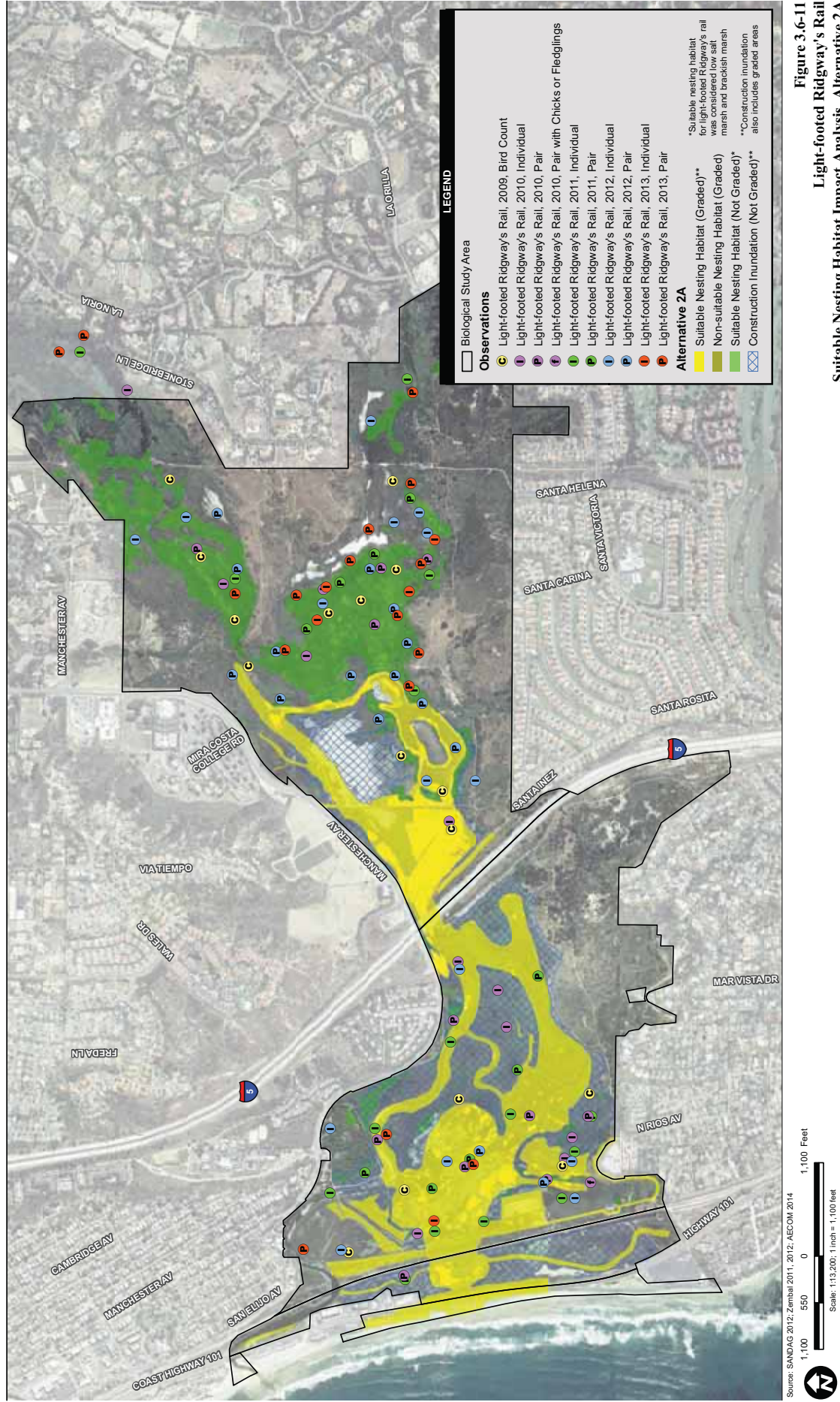


Figure 3.6-11
Light-footed Ridgway's Rail
Suitable Nesting Habitat Impact Analysis, Alternative 2A

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with temporary habitat loss, light-footed Ridgway's rail is a year-round resident in the lagoon and are considered difficult to flush by local experts; as such, there is the potential for direct mortality during vegetation removal. In an effort to avoid direct take of this species, the project would take advantage of a natural behavior in which light-footed Ridgway's rail move to higher elevations during inundation events. Although light-footed Ridgway's rail can swim, swimming is not preferred and cannot be sustained for long periods of time. The project would initiate inundation (as described in construction phasing, Chapter 2) outside of the nesting season and allow adequate time for light-footed Ridgway's rail and other wildlife to move to higher ground along the periphery of the lagoon (PDF-17). Inundation would be maintained for dredging purposes but would also be used to conduct vegetation grubbing and removal to maximize avoidance of light-footed Ridgway's rail when outside of their preferred habitat. **With implementation of project design features to restrict flooding to outside the nesting season and enhance remaining available habitats during construction, as well as construction monitoring to avoid impacts to individuals, and because greater than 50 percent of breeding habitat would remain available during construction of the proposed project, short-term direct impacts on light-footed Ridgway's rail are considered less than significant and not substantially adverse (Criterion C).**

Similar to the impacts described above for listed species, this region supports more than 20 species of shorebirds, most of which have been documented during monthly bird counts that have been conducted for over 25 years at San Elijo Lagoon by professional biologists and volunteers. Although most shorebird species do not breed within the region, they do spend most of the year here. Construction impacts would temporarily limit foraging and wintering areas for nonlisted shorebird species. **With construction phasing, impacts to nonlisted shorebirds from temporary construction are considered less than significant and not substantially adverse (Criterion C).**

INDIRECT

Indirect short-term/temporary effects to sensitive species may include increases in exposure to predators, degraded water quality, disturbed unconsolidated sediment, night lighting, and 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 undisturbed habitat, much of which is located along the perimeter of the lagoon. In addition, many of the undisturbed areas considered suitable nesting habitat for these species are not currently used for nesting, indicating it may not be preferred nesting habitat. To reduce temporary impacts to marsh birds resulting from the indirect effects of the short-term loss of nesting and foraging habitat, the project has included a variety of design features such as

preparation and implementation of a habitat enhancement plan and a predator control program (PDF-21), as described above under direct short-term/temporary impacts.

During construction, sensitive birds using the lagoon may be exposed to degraded water quality resulting from dredging and other sediment-disturbing activities. These activities may increase turbidity and the presence of unconsolidated sediments, which could lower visibility and make foraging more difficult. The increase in turbidity and unconsolidated sediments, resulting in lowered visibility, would occur relatively close to the active dredge and other construction activities and would dissipate with distance. In addition, after the equipment ceases work in any given area the material should reconsolidate within a short amount of time (hours if not a few days). As the dredge is slow moving, impacts would be isolated to discrete areas on any given day, leaving many areas within the working basin still suitable for foraging. In addition, the other basins not under active construction in the phasing scheme would also be available for foraging. Dredge operations would occur 24 hours a day, and limited night lighting would be required. Lighting would be minimal at night, as construction would be limited to dredge operation only. Lighting would be shielded away from residents and sensitive habitat areas (PDF-7). Due to the daily isolation and concentration of the impact (immediate proximity to the dredge), and the availability of other foraging habitat, these impacts are not expected to substantially adversely affect sensitive bird species. In addition, the project would implement BMPs to further reduce water quality impacts and the indirect effects to sensitive birds (see Section 3.4 Water and Aquatic Sediment Quality).

With implementation of project design features, short-term/temporary indirect impacts to sensitive species resulting from predation, lighting, and water quality are considered less than significant and not substantially adverse (Criterion C).

In addition to indirect impacts described above, there is also the potential for short-term indirect noise impacts to sensitive species as a result of construction activities. As described in Section 3.12 Noise, existing ambient noise levels at San Elijo Lagoon are considered moderate for a natural setting and are directly related to the numerous transportation corridors that traverse the lagoon. The largest contributors to ambient noise levels are I-5, separating the lagoon's largest two basins, and Coast Highway 101 near the western edge of the lagoon. In addition, Manchester Road borders the northern edge of the lagoon and the railroad separates the west and central basins. Short-term noise measurements ranged from 47.0 to 65.4 A-weighted decibels (dBA) L_{eq} with corresponding maximum noise levels (loudest single moment) ranging from 58.2 to 86.7 dBA L_{max} . The Draft Encinitas General Plan Update (City of Encinitas 2012) included a model of existing traffic noise contours near the lagoon (excluding the railroad), which is reproduced in Section 3.12. As shown, the highest noise levels are found closest to I-5 and reach 80 dBA community noise equivalent level (CNEL). Noise dissipates exponentially and, as such, the

greatest reduction occurs in short distances from the source. The contours illustrate that the quietest areas in the lagoon are located in the middle and eastern portions of the east basin and the southwest corner of the central basin (although the railroad was not included in the contours). Ambient CNEL noise levels do not drop below 60 dBA until the eastern edge of the BSA.

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, Belding's savannah sparrow, western snowy plover, California least tern, least Bell's vireo, southwestern willow flycatcher, and upland species such as the coastal California gnatcatcher. In addition, elevated noise levels have the potential to affect bird foraging behavior during the nonbreeding season. Construction equipment may vary, but it is assumed that the loudest continuous noise would be generated by dredging activity and the use of diesel engines. For the purposes of the noise analysis, a dredge was assumed using hydraulic a diesel engine, which equates to 73 dBA L_{eq} at 50 feet (Section 3.12). Unlike stationary equipment, the dredge would be mobile in the lagoon and the potential for noise impact would travel with the machinery. Dredging activity would occur up to 24 hours a day for the duration of construction. In addition to dredging, other noise-generating equipment may be used during dry construction. A worst-case scenario for equipment usage noise was developed based on two dump trucks, a bulldozer, and a large backhoe working simultaneously in a single location. This worst-case scenario resulted in an average noise level of approximately 81 dBA L_{eq} at 50 feet. 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 anticipated noise level for this type of project and allows for a conservative estimate of impacts. See Section 3.12 for a detailed discussion of noise.

Species that occupy habitat at the lagoon edge, or outside the impact footprint, would be less affected by noise than those species occurring within the impact footprint. These edge species include least Bell's vireo, southwestern willow flycatcher, and coastal California gnatcatcher. Sensitive birds, including Belding's savannah sparrow and light-footed Ridgway's rail, currently forage and breed throughout the lagoon and can be found distributed throughout the noise contours where appropriate foraging and nesting habitat occurs. Although the ambient noise levels are high for a natural system and the species have adapted to them, the addition of a dredge and other construction equipment would increase ambient levels. Currently, noise levels for the dredge are estimated at 73 dBA CNEL at 50 feet and 67 dBA CNEL at 100 feet. Other individual pieces of construction equipment may reach maximum noise levels of 80 dBA at 50 feet for most equipment (Section 3.12), but use of these types of large equipment is anticipated to be localized to areas that are likely to support dry construction (i.e., along the access road, CDFW dike, utility corridor, and nesting area). When in proximity to wildlife, the effects of dredge and other construction noise would likely be pronounced and may result in modified

foraging or breeding behavior. The greatest impact from noise would occur within the first 200 feet of equipment and would dissipate exponentially with distance. For example, one piece of equipment that generates a maximum noise level of 80 dBA at 50 feet (typically with a usage factor of 40 percent; i.e., fraction of time that the equipment is operated at full power) would attenuate to 60 dBA L_{eq} 240 feet from the source. The noise impact would be more pronounced within the quieter areas of the lagoon as opposed to the louder areas near the roads. The dredge is slow moving and construction would occur in one basin at a time; therefore, quieter habitat would always be available for birds to relocate to. However, relocation during the breeding season is not feasible for nesting birds. Avoiding construction during the breeding season was evaluated as part of the development process for this project, which included participation by resource agencies. Avoiding the breeding season would almost double the length of construction and might in fact pose a larger impact to resident marsh birds, including the listed light-footed Ridgway's rail and Belding's savannah sparrow, that breed in the lagoon. As such, the contiguous construction phased across basins is the project's best attempt to minimize overall noise impacts to sensitive species.

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 effects of noise with attenuating devices virtually impossible. **As such, noise effects on sensitive birds are considered significant and adverse (Criterion C).**

In addition to noise generated by construction equipment, an increase in noise associated with vehicular traffic may also affect sensitive species. Most of the staging areas and construction traffic routes occur outside of the lagoon environment or on the periphery where ambient noise levels from existing traffic already exist. The one vehicle route that coincides with sensitive birds is the southwest entry point in the central basin where vehicles would enter off of North Rios Avenue and travel west into the lagoon. Four coastal California gnatcatchers have been observed along this access route in previous years and are expected to nest in this area. Although implementation of the proposed project would increase the frequency of vehicular traffic along this access route, this is an area that is already being used as a maintenance corridor for the existing pump station, the railroad, and the transmission line. Birds nesting in this area are accustomed to vehicular traffic and 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 is therefore considered less than significant and not substantially adverse (Criterion C).**

LONG-TERM/PERMANENT

DIRECT

Direct long-term/permanent effects to 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 restoration project. The direct permanent changes to suitable habitat for sensitive species are summarized in Table 3.6-8. This change may include a direct increase or decrease in the total acreage of a specific habitat type post-restoration. Habitat may be actively converted (graded) or passively converted; i.e., a predictable change resulting from the new hydrology pattern associated with the restoration alternative. Implementing Alternative 2A, tidal hydrology would be extended to the east basin and the lagoon would have a modified high tide line of +4.4 feet NGVD, which is higher than the existing high tide line of +3.5 feet NGVD. As a result of the increased tidal expression (lateral distance tide moves into the lagoon) and the elevated high tide line, areas below the high tide line that are not graded as part of the restoration project may passively convert as a result of increased exposure to salt water and improved freshwater export. These areas are expected to begin conversion immediately post-restoration as a result of exposure to the new tidal regime and the corresponding changes to tidal inundation frequencies. These areas would convert in a predictable manner and as such their acreages have been included in the post-project habitat calculations and factored into this discussion regarding long-term permanent direct impacts to sensitive species.

Both least Bell's vireo and southwestern willow flycatcher utilize riparian habitat on-site for foraging habitat. Both species have been observed in low numbers (less than five in any given year) within the central and east basins, primarily within the southern willow scrub habitat. Neither species has been documented to breed on-site although vocalizing male vireos (three individuals) were detected in 2011 and may indicate that successful breeding has occurred (Patton 2010, 2012a). Alternative 2A would actively convert (i.e., grade) 4 percent of the southern willow scrub riparian habitat within the lagoon as a result of the expansion of tidal channels in the east basin and widening of tidal channels in the central basin (Table 3.6-8). As least Bell's vireo and southwestern willow flycatcher use the site primarily for foraging and occur in low numbers, the loss of 4 percent of southern willow scrub riparian habitat is not substantial and would not result in a decline in the local population below self-sustaining levels. **Therefore, impacts to least Bell's vireo and southwestern willow flycatcher with project implementation would be less than significant and not substantially adverse (Criterion C).**

Table 3.6-8
Alternative 2A Existing and Post-Construction Acreage of Suitable Habitat for Listed Bird Species

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Habitat Acreage Post-Restoration	Net Change in Habitat Acreage Post-Restoration	Percent Change Post-Restoration
light-footed Ridgway's rail	Nesting/Foraging	Coastal Brackish Marsh	131.5	96	-35.5	-27%
		Coastal Salt Marsh – Low	13.3	23	9.7	73%
	Foraging	Total Nesting	144.8	119	-25.8	-18%
		Mudflats	63.1	102	38.9	62%
		Coastal Salt Marsh – Mid	141.4	124	-17.4	-12%
		Coastal Salt Marsh – High	120	107	-13	-11%
California least tern	Nesting	Total Foraging	324.5	333	8.5	3%
		Salt Panne	36.9	17	-19.9	-54%
		Coastal Strand	5	5	0	0%
		Nesting Area**	0	2	2	200%
	Foraging	Total Nesting	41.9	24	-17.9	-43%
		Subtidal/Channels	40.1	74	33.9	85%
western snowy plover	Nesting	Beach	15	14	-1	-7%
		Total Foraging	55.1	88	32.9	60%
		CDFW Dike	0.4	0	-0.4	-100%
		Salt Panne	36.9	17	-19.9	-54%
	Foraging	Coastal Strand	5	5	0	0%
		Nesting Area**	0	2	2	200%
coastal California gnatcatcher	Nesting	Total Nesting	42.3	24	-18.3	-43%
		Mudflats	63.1	102	38.9	62%
		Beach	15	14	-1	-7%
		Total Foraging	78.1	116	37.9	49%
	Nesting/Foraging	Diegan Coastal Sage Scrub	178.1	175.56	-2.54	-1%
		Diegan Coastal Sage Scrub/Chaparral	49.3	49.3	0	0%

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Habitat Acreage Post-Restoration	Net Change in Habitat Acreage Post-Restoration	Percent Change Post-Restoration
least Bell's vireo	Nesting/Foraging	Coyote Bush Scrub	7.5	7.5	-0.02	0%
		Total Nesting/Foraging	234.9	232.34	-2.56	-1%
		Sandbar Willow Scrub	9	9	-0.06	-1%
		Southern Willow Scrub	61.4	58.8	-2.6	-4%
southwestern willow flycatcher	Nesting/Foraging	Total Nesting/Foraging	70.4	67.74	-2.66	-4%
		Southern Willow Scrub	61.4	58.8	-2.6	-4%
		Total Nesting/Foraging	61.4	58.8	-2.6	-4%
		Coastal Salt Marsh – Mid	141.4	124	-17.4	-12%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – High	120	107	-13	-11%
		Total Nesting	261.4	231	-30.4	-12%
	Foraging	Coastal Salt Marsh – Low	13.3	23	9.7	73%
		Total Foraging	13.3	23	9.7	73%

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as “foraging” is not expected to support breeding activities.

**Under existing conditions, a portion of the nesting area is classified as salt panne.

Coastal California gnatcatcher are observed along the periphery of San Elijo Lagoon within the sage scrub and chaparral habitats. As part of construction, an access road along the southwest corner of the central basin would be widened to accommodate construction vehicular traffic. This work is expected to occur within the existing road footprint. Table 3.6-8 shows up to 2.54 acres (1 percent) of permanent impacts associated with the project. These impacts include a buffer around the North Rios Avenue access road as well as the I-5 North Coast Corridor Project. The access road enhancement is expected to occur within the existing footprint, and the small trail that would be expanded to temporarily accommodate construction equipment would be restored following construction. The impacts associated with the I-5 North Coast Corridor Project are evaluated and mitigated under a separate EIR/EIS (Caltrans 2012). As such, there would be no direct impacts to occupied gnatcatcher habitat. However, in an effort to be conservative regarding long-term permanent impacts, the project evaluated the potential to impact 0.68 acre of occupied coastal sage scrub habitat along the access road off of North Rios Avenue. Over the last 5 years, two or less coastal California gnatcatcher territories were located annually within the vicinity of the road improvements area. Although coastal California gnatcatchers often occupy the same territory over consecutive years, their territories fluctuate in size and nesting often occurs throughout that territory. Any vegetation removal that would occur for the road enhancement could be narrow and linear (parallel to the existing access road). As such, impacts to any existing gnatcatcher territories would occur along the margin of the territory and would not result in the entire loss of any territories. Therefore, future nesting in this area is expected to continue following widening of the access road. The acreage associated with the access road improvements (up to 0.7 acre) in addition to the other direct impacts associated with the larger restoration effort (1.8 acres) is the equivalent of 1 percent of the suitable nesting habitat for coastal California gnatcatcher. Impacts associated with the loss of 1 percent of suitable habitat is not considered substantial and would not result in a decline in the local population below self-sustaining levels. **Therefore, impacts to coastal California gnatcatcher with project implementation would be less than significant and not substantially adverse (Criterion C).**

Both California least tern and western snowy plover are documented annually, foraging and roosting at San Elijo Lagoon. Historically, both species nested on-site; however, western snowy plover has not successfully nested at San Elijo Lagoon since 2002, and California least tern since 2005 (CDFG 2006; Patton 2010). Ideal nesting sites for each species are similar, consisting of undisturbed, sparsely vegetated, flat areas with loose, sandy substrate. Potential nesting habitat for these species within the lagoon includes the salt panne, coastal strand, and CDFW dike. Alternative 2A would permanently decrease suitable nesting habitat for California least tern by 6.8 acres (16.1 percent of suitable nesting habitat) and decrease suitable nesting habitat for western snowy plover by 7.2 acres (16.9 percent of suitable nesting habitat). As neither species currently breeds on-site, the loss of nesting habitat does not substantially affect either species. Following restoration, both species are expected to benefit from the restoration of the lagoon.

Foraging habitat for both species would increase with an 85 percent increase in open water and subtidal channels used by California least tern and a 62 percent increase in mudflat used by western snowy plover. The condition of foraging habitat is also expected to improve as a result of restoration due to tidal influx and water quality, and improved benthic community. The improved water quality, tidal circulation, and restoration to appropriate habitat elevations would enhance environmental conditions for the prey communities that both birds feed on. The regular influx of tidal waters is expected to deliver larvae to the site, which may in turn increase densities and species richness of the benthic community. This directly benefits western snowy plover in addition to other foraging birds. Similarly, improvements to water quality and tidal circulation would improve environmental conditions for the fish community, which would benefit least tern and other diving birds. The restoration project would directly benefit these species that regularly use the lagoon for foraging and roosting, by increasing foraging habitat in both quantity and quality. **As such, no significant or substantially adverse impacts would result with project implementation (Criterion C).**

As depicted in Table 3.6-8, Alternative 2A would reduce available nesting habitat for Belding's savannah sparrow by 30.4 acres, which equates to a loss of 11 percent compared to existing conditions. The greatest reduction is within the central basin where mid-marsh is being replaced with mudflat and low-marsh habitat. Based on best professional judgment, trends observed in other lagoon restoration projects, and long-term species monitoring programs, Belding's savannah sparrow territory size and density are highly variable and often a reflection of environmental conditions (Zemba et al. 1988). In extreme wet and dry years when habitat is unsuitable for nesting the territories size may be substantially smaller than in moderate years where more area is suitable. Similarly, when restoration efforts at Bolsa Chica reduced available nesting habitat but improved the quality of the available habitat, the population increased and territory sizes reduced resulting in higher densities in remaining habitat (Merkel & Associates 2009). Based on this information, the reduction in nesting habitat for Alternative 2A would not result in a decline in the local population below self-sustaining levels. 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 high-marsh habitat is highly variable and is 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 they can only nest on dry soil. Improved hydrology would enhance tidal flushing and freshwater export, which would facilitate the drying of high-marsh habitat used for ground nesting. In addition, restoring tidal flushing and salt water exposure to the existing salt marsh habitat in the northeast portion of the lagoon may also improve habitat structure. Although these areas support pickleweed, they are dominated by other native salt marsh species. The presence of these other native salt marsh species makes these areas less preferable for nesting as compared to the dense pickleweed habitat found within the central basin and the western end of the east basin.

While the project would result in an overall reduction in available nesting habitat of 11 percent, the improved conditions for the remaining 231 acres (89 percent) of mid- and high-marsh habitat resulting from the restoration, as well as the improved lagoon condition, outweigh the impact associated with the numeric loss of habitat acreage. **The project would ultimately benefit the Belding's savannah sparrow population at San Elijo Lagoon and impacts are considered less than significant and not substantially adverse (Criterion C).**

Light-footed Ridgway's rail nesting and foraging habitat would be modified as part of this alternative. Post-restoration, there would be a net loss of nesting habitat acreage for light-footed Ridgway's rail by 24.8 acres, which equates to a loss of 18 percent when compared to existing conditions. The greatest reduction is within the east basin where brackish marsh would be replaced by subtidal and low-marsh habitat. Although brackish marsh would be reduced, the preferred habitat of light-footed Ridgway's rail is low-marsh, which is currently limited in the lagoon. Alternative 2A would result in an increase in the low-marsh from the current 13.3 acres to 23 acres. It should be noted that, although the No Project/No Federal Action Alternative is analyzed separately, low-marsh habitat is expected to continue to expand under existing conditions. This is a result of the now regular maintenance of the lagoon mouth and the artificially established mudflat that currently exists at an unsustainable higher elevation. When the lagoon reaches an equilibrium state, it is predicted that low-marsh would increase to 51 acres compared to existing conditions (13 acres) while brackish marsh would remain unchanged. 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 low-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 these less than optimal conditions would continue without restoration. The increase in low-marsh habitat expected at equilibrium would be directly correlated to the net loss of mudflat acreage (63 acres in 2012 versus 29 acres at equilibrium), which is critical foraging habitat for the year-round resident light-footed Ridgway's rail, as well as other foraging birds.

Under Alternative 2A, the expansion of the low-marsh habitat (compared to existing conditions) for light-footed Ridgway's rail would occur in the central and east basins. In addition to affecting habitat acreage, the changes to lagoon hydrology under the alternative would also improve the condition of the remaining foraging and nesting habitat for light-footed Ridgway's rail. Under current conditions, much of the brackish marsh in the east lagoon is inundated with standing, potentially stagnant water. The low-marsh habitat is occupying nutrient-laden sediment which often experiences periods of anoxia. The extension of the tidal prism farther east, in addition to the improved tidal flushing and freshwater export, is expected to enhance the condition of the remaining brackish marsh. Foraging habitat would also be affected by Alternative 2A with a small net increase (3 percent) in acreage but a larger improvement in condition. Light-footed

Ridgway's rail forage within their nesting habitat in addition to mudflats, mid-marsh, and high-marsh habitats. The regular influx of tidal waters and proper tidal flushing is expected to enhance the benthic community in foraging habitats, but particularly mudflats. 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 light-footed Ridgway's rail population within the lagoon. Ultimately, the project is expected to benefit light-footed Ridgway's rail populations at San Elijo Lagoon. **Therefore, impacts to light-footed Ridgway's rail with implementation of Alternative 2A are considered less than significant and not substantially adverse (Criterion C).**

Similar to the impacts described above for listed species, this region supports more than 20 species of shorebirds, most of which have been documented during monthly bird counts that have been conducted for over 25 years at San Elijo Lagoon by professional biologists and volunteers. Improved hydrologic and water quality conditions, as well as the targeted balance of habitats associated with Alternative 2A, including an increase in mudflats, would provide substantial benefit to foraging and wintering shorebirds. **Therefore, impacts to nonlisted shorebirds with implementation of Alternative 2 A are considered less than significant and not substantially adverse (Criterion C).**

As part of the restoration project, there would be long-term monitoring and maintenance. This may include, but is not limited to, biological monitoring, nonnative species treatment, isolated regrading or recontouring, and other adaptive management strategies. Although each of these actions is intended to enhance the success of the restoration effort, there is the potential for impacts to sensitive birds in the lagoon. Avoidance measures such as those described in Section 2.11 would be included in the adaptive management program. **With the implementation of these measures, long-term monitoring and maintenance is not expected to have a substantial effect on any sensitive species and impacts are considered less than significant and not substantially adverse (Criterion C).**

With implementation of project design features and the net benefits of the restoration project, permanent direct impacts to sensitive species from active conversion of nesting and/or foraging habitat, modified lagoon conditions, and long-term maintenance and operation are considered less than significant and not substantially adverse (Criterion C).

INDIRECT

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

Habitat above the high tide line, within the transitional area, may passively transition (change) over a long period of time. The transitional area is considered to begin at the high tide line and extend up to 2+ feet above the high tide line. For Alternative 2A, this area is found between +4.4 feet NGVD and +6.4 feet NGVD. Transitional areas provide refugia opportunity to estuarine-dependent wildlife during extreme high tides and periods of extensive lagoon inundation. As a result of this project, the transitional area would include constructed and existing natural areas. Passive transition of habitat within the new natural transitional area is possible although unpredictable. In particular, these areas are important for Belding's savannah sparrow and light-footed Ridgway's rail as these species are year-round residents that occupy lower-elevation marsh habitat that is regularly affected by tides. In addition, light-footed Ridgway's rail currently occupies and nests in a large portion of brackish marsh in the east basin that would occur within the new natural transitional area. Over time, this area may change from brackish marsh to salt marsh habitat. Although the change in habitat is unpredictable in the transitional area, the connection to tidal hydrology and the improved freshwater export are expected to ultimately enhance the condition of the existing habitat within the east basin transitional area. In addition, impacts to sensitive species resulting from changes to the new transitional area are not considered substantial.

It is possible that reduced periods of saturation and increased salinity may make transitional areas in the east basin more prone to invasion by nonnative species. In particular, areas going through a transition from one habitat type to another may have an increased percentage of bare ground as species die and new recruits arrive. Of particular concern is the salt-tolerant *Tamarix* spp. (tamarisk or salt cedar), which can be highly invasive in estuarine systems and preclude native plant community development. Nonnative invasive species have the potential to exclude native plant recruits and ultimately shape the vegetation community to something less than suitable for estuarine wildlife, including the Belding's savannah sparrow and light-footed Ridgway's rail. As part of the post-construction habitat monitoring and maintenance program for this project, the occurrence of these invasive species would be closely monitored as well as the potential die-off of emergent vegetation (i.e., cattails) in the east basin. 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 substantial.

Indirect changes to lagoon condition are expected as a result of restoration and the corresponding improvement to water quality and tidal hydrology (e.g., lower eutrophication; and increased circulation, turnover, freshwater export). Although not quantifiable, these changes are associated with a properly functioning lagoon system with a predominantly open mouth. In particular, changes to water quality are expected including increased oxygenation, reduced or eliminated periods of anoxic conditions, and water temperature regulation. These improvements to water quality and overall lagoon conditions are expected to directly and indirectly benefit sensitive species on-site. The improved conditions would likely result in increased foodweb complexity, including improvements to the terrestrial insect population, the benthic invertebrate population, and the subtidal fish population. All of these communities are primary food sources for various sensitive species and others residing in the lagoon. The indirect improvement to water quality would benefit sensitive species.

With implementation of project design features (i.e., PDFs 7–9, 12–14, 16, 18, 20–22) and the net benefits of the restoration project, indirect permanent impacts to sensitive species from passive transition of nesting and/or foraging habitat and invasive species are considered less than significant and not substantially adverse (Criterion C).

Wildlife Corridors/Connectivity

As described in Section 3.6.1, San Elijo Lagoon is not functioning as a regional corridor. Instead, it is a large area of natural open space connected to Escondido Creek. Escondido Creek links San Elijo Lagoon with other open space habitat in Harmony Grove and the Elfin Forest to the northeast. San Elijo Lagoon is an important natural open space that provides a large area of habitat for core populations of sensitive wildlife and plant species. Alternative 2A would result in temporary and short-term impacts to wildlife movement throughout the lagoon during grading, dredging, and controlled inundation operations. However, construction would be phased and occur within discrete locations at discrete timeframes within the lagoon basins, thereby allowing for wildlife movement within 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 or substantially adverse short-term or long-term impacts to wildlife movement/connectivity are anticipated with implementation of Alternative 2A (Criterion D).**

Local Ordinances/Policies/Adopted Plans

Section 3.1 Land Use evaluates the project's consistency with local, state, and federal plans. In addition to these land use plans, the project would be required to be consistent with regional conservation plans. Two regional planning documents cover the San Elijo Lagoon BSA, the draft North County MSCP (County of San Diego 2009) and the North County MHCP (AMEC et al. 2003). The North County MSCP expands the County MSCP into the northwestern unincorporated areas of San Diego County. The portions of the lagoon owned by the County of San Diego (primarily the east basin) are within the North County MSCP area. Portions of the BSA are within conservation areas referred to as the Preserve Area and Pre-Approved Mitigation Area under the draft North County MSCP. The majority of the central and west basins are covered in the MHCP. Both documents allow for restoration of preserve areas. Specifically, the MHCP and the North County MSCP acknowledge the intent for restoration of San Elijo Lagoon (see North County MSCP Section 8.16 and MHCP Section 6.3.5). All restoration, maintenance and monitoring plans prepared for Alternative 2A 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 both the MHCP and North County MSCP. **Therefore, no significant or substantially adverse impact would result with implementation of Alternative 2A (Criterion E).**

Alternative 1B

The following section evaluates direct and indirect impacts, as well as permanent and temporary impacts to biological resources associated with Alternative 1B. Minimal discussion is provided where impacts are similar to or less than Alternative 2A. However, if the impact is unique to this alternative or notably different than Alternative 2A, then further discussion is provided.

Sensitive Riparian and Natural Vegetation Communities

Short-term/Temporary

Construction of Alternative 1B would, similar to Alternative 2A, result in temporary or short-term impacts to sensitive habitats associated with grading and dredging operations. The project is anticipated to take approximately 3 years to construct and would be phased to minimize impacts to the lagoon habitats, allowing for refuge and retaining some available habitats at any given time during construction. Inundation durations would be similar to Alternative 2A, as areas proposed for inundation would be inundated for 3 months or longer. Therefore, it is assumed that this vegetation would be substantially impacted and, as a worst-case scenario, it is assumed that vegetation in inundated areas would not survive (i.e., habitat would be lost for more than 12

months). The adaptive management program and conceptual restoration plan (Appendix Q) for the project, as described in Chapter 2.11, includes measures for monitoring and maintenance activities to aid in the recovery of inundated vegetation communities.

Impacts are summarized in Table 3.6-9 and are separated into two types of short-term impacts: areas that would be graded/dredged during construction, and areas that would be affected by inundation only. A complete breakdown of impacts by basin is provided in the BTR included as Appendix F. Impacts associated with Alternative 1B would be similar to the impacts from Alternative 2A, while there would be slightly reduced grading/dredging impacts, and slightly greater inundation impacts. Overall, impacts to the lagoon are similar with approximately 32 percent of the lagoon being impacted by restoration construction. Grading/dredging impacts would occur in approximately 182 acres (approximately 19 percent) of habitat and inundation would impact an additional 130 acres (approximately 13 percent) of habitat within the San Elijo Lagoon BSA (Figure 3.6-12). The extensive hillsides along the lagoon and the eastern end of the BSA would not be impacted by restoration construction.

Table 3.6-9
Direct Project Impacts from Construction of Alternative 1B

Basin/Habitat Community	Existing Vegetation (acres) within the BSA	Alternative 1B Direct Impacts from Dredging/Grading (acres)	Alternative 1B Direct Impacts from Inundation	Habitat Temporarily Impacted (% in BSA)
Beach	15.0	2.1	0	14%
Coastal Brackish Marsh	131.5	23.9	4.2	21%
Coastal Salt Marsh – High	120.0	12.5	3.3	13%
Coastal Salt Marsh – Low	13.3	6.4	5.8	92%
Coastal Salt Marsh – Mid	141.4	50.6	69.2	85%
Coastal Strand	5.0	0	1.4	28%
Coyote Bush Scrub	7.5	0	0	0%
Developed	23.4	6.0	0.1	26%
Diegan Coastal Sage Scrub	178.2	4.5	0.7	3%
Diegan Coastal Sage Scrub/Chaparral	49.3	0	0	0%
Disturbed Habitat	11.9	2.9	0.8	31%
Disturbed Wetland	1.1	0	0	0%
Eucalyptus Woodland	19.1	0	0.1	1%
Nonnative Grassland	33.1	0	0	0%
Open Water	40.1	31.5	3.0	86%
Salt Panne/Open Water	37.0	6.6	13.7	55%
Sandbar Willow Scrub	8.9	0	0	0%
Southern Willow Scrub	61.3	2.9	2.2	8%
Tidal Mud Flat/Open Water	63.1	32.0	25.2	91%
Total	960.2	181.9	129.7	32%

Similar to Alternative 2A, restoration construction would result in greater than 50 percent temporal loss of sensitive habitats that would be significantly impacted by construction including

coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats. The temporal loss of these habitats may threaten local populations of sensitive resident species, as described further in the Sensitive Species section below. **Short-term direct impacts to coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats are therefore considered significant and adverse (Criterion A).**

Temporary impacts to beach, coastal brackish marsh, high-coastal salt marsh, coastal strand, Diegan coastal sage scrub, and southern willow scrub are not considered significant because greater than 50 percent of the local habitat would remain available to local resident and migratory species during construction. **Short-term direct impacts to beach, coastal brackish marsh, high-coastal salt marsh, coastal strand, Diegan coastal sage scrub, and southern willow scrub are therefore considered less than significant and not substantially adverse (Criterion A).**

No direct impacts are proposed to coyote bush scrub, Diegan coastal sage scrub/chaparral, disturbed wetland, nonnative grassland, and sandbar willow scrub.

USFWS Critical Habitat

Impacts to USFWS critical habitat and the associated PCEs for western snowy plover would be similar to Alternative 2A. As with Alternative 2A, temporary impacts to critical habitat and the associated PCEs, for the purpose of restoration, would be considered less than significant.

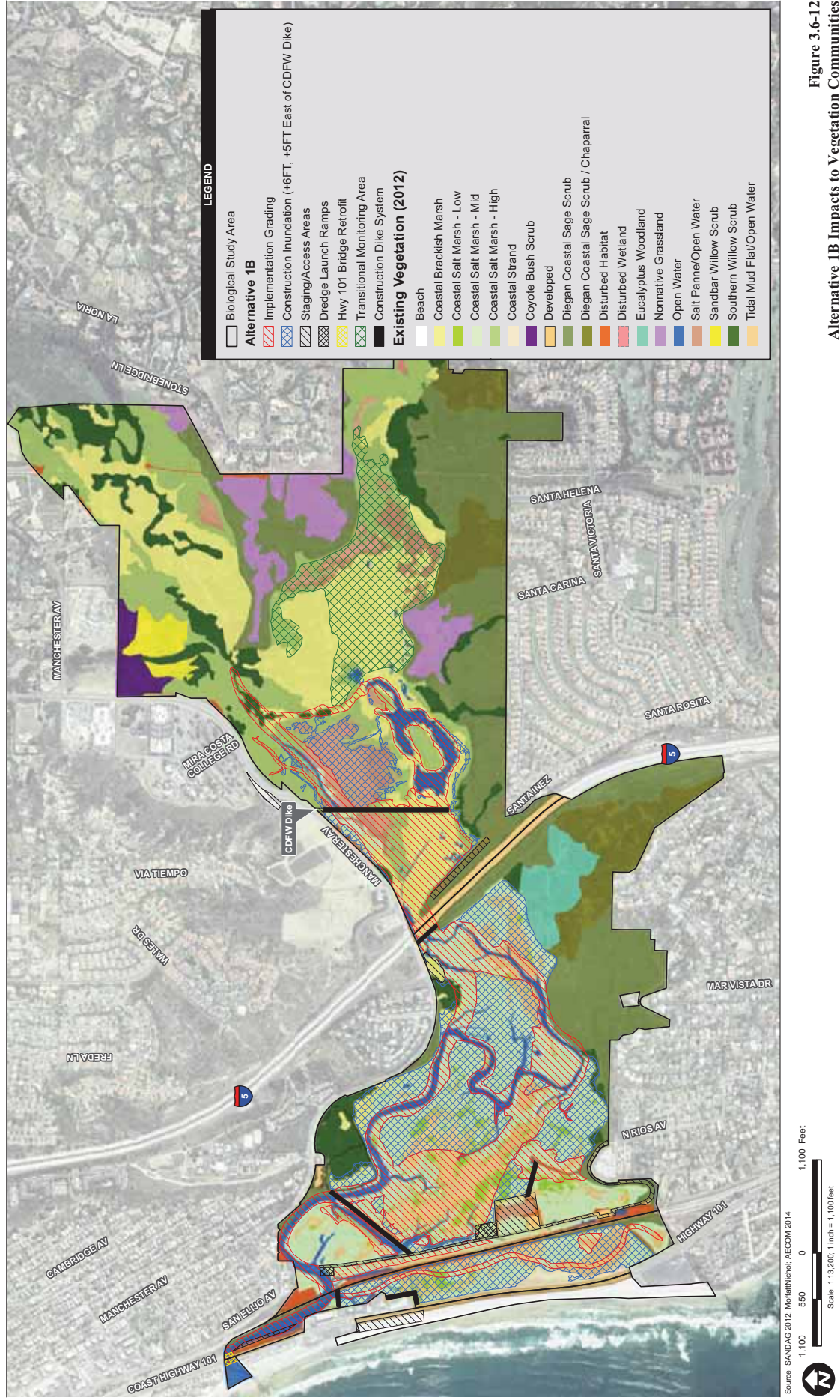
Similar to Alternative 2A, no new impacts to coastal California gnatcatcher critical habitat would result from restoration construction. **Therefore, impacts would be considered less than significant and not substantially adverse (Criterion A).**

Essential Fish Habitat

Construction of Alternative 1B would result in similar temporary and short-term impacts to EFH associated with grading and dredging operations as discussed under Alternative 2A. **No significant or substantially adverse impacts to EFH are anticipated with implementation of Alternative 1B (Criterion A).**

Indirect Impacts

Short-term indirect impacts associated with Alternative 1B would be similar to Alternative 2A. **No significant or substantially adverse indirect impacts to vegetation communities would result with project implementation (Criterion A).**



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Long-Term/Permanent

Long-term changes in vegetation (5–10 years post-restoration) would occur from implementation of Alternative 1B, as shown in Table 3.6-6 and Figure 2-8. Within 5–10 years following restoration, habitats are expected to have substantially recovered and matured. The overall acreage of sensitive habitats within the lagoon would remain approximately 960 acres. However, changes to sensitive vegetation in the lagoon would occur with the dredging of channels/basins, grading, and improvements to water quality and hydrologic function.

Alternative 1B incorporates water quality and hydrologic improvements and proposes additional grading and dredging to further increase tidal influence in the central and east basins while retaining the existing ocean inlet. Major features of Alternative 1B include a matrix of mudflats and secondary channels south of the main channel. Existing emergent low-marsh would be retained (i.e., would not be graded, but would be inundated) to the extent possible to create a diverse habitat distribution in the basin. Based on hydrologic modeling (M&N 2012a), little change would occur in habitat distributions in the east basin under Alternative 1B relative to Alternative 2A, except that, under Alternative 1B, greater low-marsh would be retained at the expense of additional mudflat.

Alternative 1B would result in an increase in subtidal habitat relative to the existing and projected No Project/No Federal Action conditions. Most of the increase in subtidal habitat would occur in the central and east basins and would result in a corresponding decrease in nontidal high-salt marsh, salt panne, freshwater/brackish marsh, and riparian habitats. The open freshwater ponds currently maintained by the CDFW dike would be converted to subtidal habitat. Intertidal mudflat habitat would be increased relative to existing and projected No Project/No Federal Action conditions, with a corresponding decrease in mid-salt marsh. Man-made transition zone habitat would increase through placement of dredged sediments in selected areas of the central and east basins. This increase would result in a corresponding decrease in mid-salt marsh and upland areas.

Alternative 1B would facilitate the efficient conveyance of seasonal freshwater flows through the system to the existing inlet. Similar to Alternative 2A, an avian nesting area located in the central basin would be established. Removal of the CDFW dike under this alternative may restrict management options that would support avian nesting on salt panne habitat in the east basin. As described under Alternative 2A, the salt panne habitat existing within the lagoon is a relic habitat that the SELRP anticipates retaining, although the location of the salt panne is not typical of natural salt panne habitat in other regional lagoons and estuaries. CDFW does not currently actively manage water levels east of the dike, although, in the past, gates within the dike were opened and closed seasonally. While this alternative would remove the CDFW dike and increase

hydraulic efficiency of the channel adjacent to the existing salt panne, a portion of the dike would be left in place west of the salt panne as transitional area and it is anticipated that the salt panne would continue to be inundated occasionally during high water flow conditions, although it may drain more quickly. Similar sequences of inundation, drainage, and evaporation would occur, enabling the continued existence of the habitat.

In summary, habitat changes for Alternative 1B trend similarly to Alternative 2A, although the majority of the salt panne and low-marsh habitat is retained, with less mid-marsh and mudflat habitat planned under this alternative. Similar to Alternative 2A, with implementation of Alternative 1B, mudflat, open water, and created transitional habitats would substantially increase. Under Alternative 1B, salt marsh, freshwater/brackish marsh, and riparian habitats would be reduced. The overall acreage of habitat available for sensitive species would remain unchanged with this alternative. In addition, habitats that remain unchanged are expected to benefit from the improved water quality and hydrologic function within the lagoon. When considering changes to sensitive habitats, a change from one sensitive habitat to another does not necessarily represent a positive or negative impact. Rather, the ecological ramifications of the change on sensitive species and lagoon ecology would be the primary indicators of impact. As described in Chapter 2 and noted above under Alternative 2A, the lagoon habitat is rapidly transitioning over time, with continued loss of mudflat and rapid increase in salt marsh. With rapid transition to salt marsh, there is a reduction in available foraging habitat for sensitive and nonsensitive birds, which has the potential for significant ecological changes in the lagoon and is expected to dramatically change the diversity and density of wildlife that the lagoon is able to continue to support. With implementation of Alternative 1B, the project would result in improved water quality and hydrologic function, as well as increased foraging habitat, and would reverse the rapid changes occurring under existing conditions. Species-specific impacts associated with these changes are evaluated below. The substantial change in habitat from one sensitive vegetation community to another sensitive vegetation community does not in itself represent a significant biological impact. **With improved lagoon ecology, increased foraging for species, and no overall loss of lagoon resources, impacts to sensitive vegetation communities with project implementation of Alternative 1B are considered less than significant and not substantially adverse (Criterion A).**

USFWS Critical Habitat

The impacts to USFWS critical habitat would be the same as for Alternative 2A and are therefore considered less than significant and not substantially adverse (Criterion A).

Essential Fish Habitat

Construction of Alternative 1B would result in similar long-term beneficial impacts to EFH as discussed under Alternative 2A. This alternative would create additional acreages of open water, tidal channels, and mudflat habitat, as well as enhance the conditions of existing subtidal habitat by increasing tidal influence within the lagoon. Although less subtidal habitat would be created under this alternative, this additional acreage of habitat would also support local fish populations and benefit EFH within the project area. **No long-term significant or substantially adverse impact to EFH is anticipated with implementation of Alternative 1B (Criterion A).**

Indirect Impacts

Long-term indirect changes to the vegetation communities for Alternative 1B would be similar to those described for Alternative 2A. **Indirect passive/natural transition of habitat is anticipated to be neutral or beneficial to the lagoon, and would be monitored via the project's adaptive management program, as described in Section 2.11. Impacts are therefore considered less than significant and not substantially adverse (Criterion A).**

Jurisdictional Waters and Wetlands

Of the approximately 620 acres of wetlands, approximately 285.8 acres would be directly impacted by construction (159.2 acres from grading/dredging and 126.6 acres from inundation). Of this, approximately 0.28 acre is considered state-only waters, because it represents the riprap bank at the existing inlet to the lagoon. **The short-term and long-term (direct and indirect) impacts resulting from the implementation of Alternative 1B would be similar to those discussed for Alternative 2A and are considered less than significant and not substantially adverse (Criterion B).**

Sensitive Species

Flora

No federally or state-listed rare, threatened, or endangered plant species occur within the areas proposed for restoration. As with Alternative 2A, one federally listed plant species, Del Mar manzanita and one state-listed species, Orcutt's goldenbush, occur in upland habitat and would not be affected by the proposed project.

Approximately 11 individuals of southwestern spiny rush (CNPS List 4.2) are within the grading limits of Alternative 1B and would be directly impacted. However, this direct impact is not considered significant, due to the several hundred individuals scattered throughout the mid- and

high-salt marsh habitats within the lagoon. The large population of southwestern spiny rush is expected to persist within the lagoon, as the majority of the mid- and high-salt marsh habitats would remain intact. **Therefore, no significant or substantially adverse impacts to sensitive plant populations are anticipated with construction of Alternative 1B (Criterion C).**

Fauna

There is the potential for short-term/temporary effects as well as long-term/permanent effects associated with the implementation of Alternative 1B. As with Alternative 2A, these effects would be the result of grading, dredging, and controlled prolonged inundation. These effects may be considered negative (impact) or positive (benefit). Both are discussed related to the seven state and/or federally listed species as described under Alternative 2A.

SHORT-TERM/TEMPORARY

There is the potential for direct and indirect short-term/temporary changes as a result of Alternative 1B that may affect sensitive species.

DIRECT

Direct short-term/temporary effects may include the short-term loss of nesting and/or foraging habitat as well as noise impacts as a result of construction activities grading, dredging, and controlled prolonged inundation.

Impacts resulting from Alternative 1B are similar to Alternative 2A but to a lesser extent. This alternative was designed to maximize lagoon habitat diversity while minimizing direct impacts to the rapidly expanding low-marsh habitat. As part of the restoration effort, nesting or foraging habitat would be temporarily impacted (i.e., graded, dredged, or inundated) during construction, which may affect listed species that use the lagoon and rely on this habitat. The direct temporary impacts to listed species habitat, including nesting and foraging, are summarized in Table 3.6-10 and, as with Alternative 2A, short-term impacts are separated into two types: areas that would be graded/dredged during construction, and areas that would be affected by controlled inundation only. Although both impacts are direct, the duration of the temporary impacts associated with inundation is less predictable as these vegetation communities are adapted to tolerate long periods of inundation. Phased construction across the three lagoon basins would preserve some habitat areas, allowing for species refugia during construction, and would also restrict vegetation removal activities to outside of the nesting season.

Table 3.6-10
Alternative 1B Impacts to Suitable Habitat for Listed Bird Species

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Grading Direct Impact to Existing Habitat		Inundation Direct Impact to Existing Habitat		Total Direct Impact to Existing Habitat	
				Acres	Percent	Acres	Percent	Total Acres	Total Percent
light-footed Ridgway's rail	Nesting/Foraging	Coastal Brackish Marsh	131.5	23.9	18%	4.2	3%	28.1	21%
		Coastal Salt Marsh – Low	13.3	6.4	48%	5.8	44%	12.2	92%
	Foraging	Total Nesting	144.8	30.3	21%	10	7%	40.3	28%
		Mudflats	63.1	32.1	51%	25.2	40%	57.3	91%
California least tern	Nesting	Coastal Salt Marsh – Mid	141.4	50.7	36%	69.2	49%	119.9	85%
		Coastal Salt Marsh – High	120	12.5	10%	3.3	3%	15.8	13%
		Total Foraging	324.5	95.3	29%	97.7	30%	193.0	59%
		Salt Pannes	36.9	6.6	18%	13.7	37%	20.3	55%
	Foraging	Coastal Strand	5	0	0%	1.4	28%	1.4	28%
		Nesting Area**	0	0	0%	0	0%	0.0	0%
		Total Nesting	41.9	6.6	16%	15.1	36%	21.7	52%
		Subtidal/Channels	40.1	31.4	78%	3	7%	34.4	86%
western snowy plover	Nesting	Beach	15	2.1	0%	0	0%	2.1	14%
		Total Foraging	55.1	31.4	57%	3	5%	34.4	62%
		CDFW Dike	0.4	0.4	100%	0	0%	0.4	100%
		Salt Pannes	36.9	6.6	18%	13.7	37%	20.3	55%
	Foraging	Coastal Strand	5	0	0%	1.4	28%	1.4	28%
		Nesting Area**	0	0	0%	0	0%	0.0	0%
		Total Nesting	42.3	7	17%	15.1	36%	22.1	52%
		Mudflats	63.1	32.1	51%	25.2	40%	57.3	91%
coastal California	Nesting/Foraging	Beach	15	2.1	0%	0	0%	2.1	14%
		Total Foraging	78.1	32.1	41%	25.2	32%	57.3	73%
		Diegan Coastal Sage Scrub	178.1	4.6	3%	0.7	0%	5.3	3%
		Diegan Coastal Sage Scrub/Chaparral	49.3	0	0%	0.03	0%	0.0	0%

3.6 Biological Resources

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Grading Direct Impact to Existing Habitat		Inundation Direct Impact to Existing Habitat		Total Direct Impact to Existing Habitat	
				Acres	Percent	Acres	Percent	Total Acres	Total Percent
gnatcatcher		Coyote Bush Scrub	7.5	0	0%	0	0%	0.0	0%
		Total Nesting/Foraging	234.9	4.6	2%	0.73	0%	5.3	2%
		Sandbar Willow Scrub	9	0	0%	0	0%	0.0	0%
least Bell's vireo	Nesting/Foraging	Southern Willow Scrub	61.4	2.9	5%	2.2	4%	5.1	8%
		Total Nesting/Foraging	70.4	2.9	4%	2.2	3%	5.1	7%
		Southern Willow Scrub	61.4	2.9	5%	2.2	4%	5.1	8%
southwestern willow flycatcher	Nesting/Foraging	Total Nesting/Foraging	61.4	2.9	5%	2.2	4%	5.1	8%
		Coastal Salt Marsh – Mid	141.4	50.7	36%	69.2	49%	119.9	85%
		Coastal Salt Marsh – High	120	12.5	10%	3.3	3%	15.8	13%
Belding's savannah sparrow	Nesting	Total Nesting	261.4	63.2	24%	72.5	28%	135.7	52%
		Coastal Salt Marsh – Low	13.3	6.4	48%	5.8	44%	12.2	92%
		Total Foraging	13.3	6.4	48%	5.8	44%	12.2	92%

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as “foraging” is not expected to support breeding activities.

**Under existing conditions, a portion of the nesting area is classified as salt panne.

Short-term direct impacts to both least Bell's vireo and southwestern willow flycatcher as a result of Alternative 1B are similar to those described for Alternative 2A. Both species have been observed in low numbers foraging primarily within the southern willow scrub habitat. Construction of Alternative 1B would directly impact 5.1 acres (8 percent) of the southern willow scrub riparian habitat within the lagoon as a result of grading and inundation (Table 3.6-10). As vegetation would be removed outside of the breeding season and both species use the site primarily for foraging during summer months, the short-term impact to 8 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. **Therefore, short-term direct impacts to least Bell's vireo and southwestern willow flycatcher would be less than significant and not substantially adverse (Criterion C).**

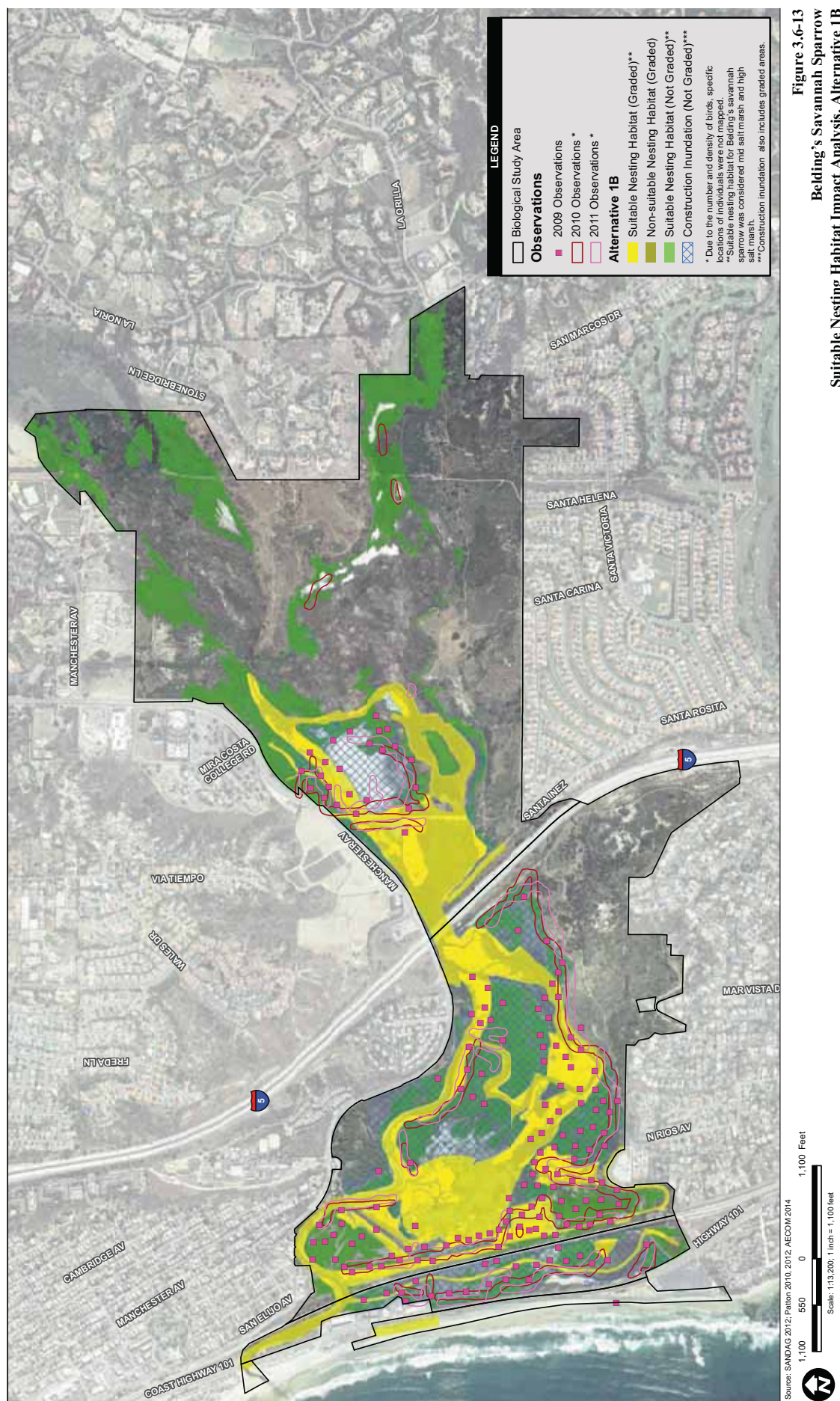
Coastal California gnatcatcher are observed along the periphery of San Elijo Lagoon within the sage scrub and chaparral habitats. As described for Alternative 2A, an access road along the southwest corner of the central basin may need to be enhanced to accommodate construction vehicular traffic for Alternative 1B. In addition, a small foot trail would be temporarily expanded to allow vehicle access to the created transitional habitat and staging area. The intent is to limit road enhancement activities to the existing footprint; however, a conservative analysis of potential impacts has been included. The road and trail enhancement activities are the same for both alternatives. There is the potential to impact nesting coastal California gnatcatcher in this area during vegetation removal. To avoid this potential impact, vegetation would be cleared outside of the bird nesting season. Temporary impacts to gnatcatcher would not result in a decline in the local population below self-sustaining levels. **Therefore, impacts are considered less than significant and not substantially adverse (Criterion C).**

Impacts to both California least tern and western snowy plover are similar to those described for Alternative 2A, including impacts to foraging habitat for both species as a result of grading and habitat conversion (Table 3.6-10). Primary differences include 7 additional acres of temporary impacts on subtidal channels under Alternative 1B relative to Alternative 2A in addition to 2.8 acres of impacts to beach habitat for Alternative 1B. Impacts to foraging habitat would be phased across the three lagoon basins and within each basin, so that large contiguous areas of foraging habitat would remain. Although short-term impacts to foraging habitat would occur, short-term benefits are also expected as lagoon conditions improve. The improved conditions would result in higher productivity in the restored mudflats and subtidal habitat and direct benefits to birds that forage on them, such as the California least tern and western snowy plover. **Therefore impacts are considered less than significant and not substantially adverse (Criterion C).**

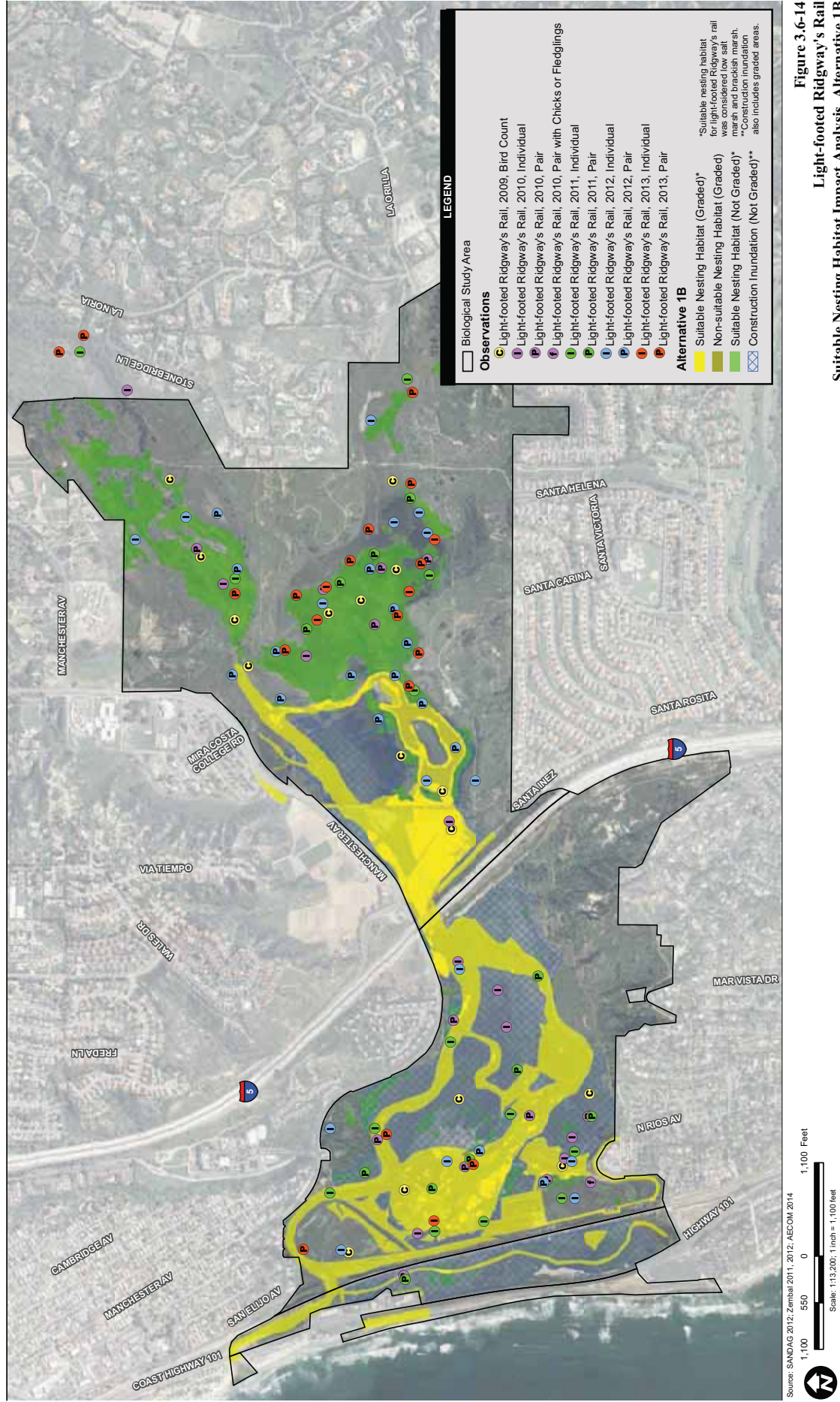
Under Alternative 1B, temporary impacts to Belding's savannah sparrow are almost identical to Alternative 2A with impacts to nesting and foraging habitat resulting from dredging and

inundation (Figure 3.6-13). Temporary impact acreages are presented in Table 3.6-10. A total of 135.7 acres out of 261.4 acres (52 percent) of suitable nesting habitat for Belding's savannah sparrow would be impacted as a result of construction for Alternative 1B. In addition, 12.2 acres (92 percent) of low-marsh, an important foraging habitat for Belding's savannah sparrow, would be impacted. As with Alternative 2A, Alternative 1B would create noninundated refugia in the west and central basins to maximize available nesting and foraging habitat during construction. It is anticipated that resident Belding's savannah sparrow would respond to the restoration as they do to seasonal variability by shifting and contracting their territory size to accommodate new available acreage. Those birds that do not relocate to the refugia may remain on the perimeter of the lagoon or may choose to leave the lagoon and seek residency elsewhere. The project would minimize impacts by removing vegetation outside of the breeding season, using controlled inundation to move birds out of the work area, and implementing a habitat enhancement plan. Belding's savannah sparrow is a year-round resident and project construction would result in the temporary loss of greater than 50 percent of their nesting habitat (mid- and high-salt marsh). This temporary construction impact is considered a significant impact to the local population. **As such, Alternative 1B would have a significant and adverse short-term direct impact on Belding's savannah sparrow (Criterion C).**

Impacts to light-footed Ridgway's rail from Alternative 1B would be similar to Alternative 2A, including direct impacts to 40.3 acres (28 percent) of existing suitable nesting habitat (Table 3.6-10 and Figure 3.6-14). In addition, Alternative 1B would temporarily impact 193 acres (59 percent) of foraging habitat, including mudflats (57.3 acres), mid-marsh (119.9 acres), and high-marsh (15.8 acres). As mentioned above, Alternative 1B was designed to minimize grading impacts to the rapidly expanding low-marsh habitat, which is the preferred nesting habitat of the light-footed Ridgway's rail. The primary impact to low-marsh habitat is a result of the overdredge pit in the central basin, which is needed for soil disposal associated with dredging, as well as the need to conduct controlled inundation to accommodate the dredge. These impacts, in addition to the channel expansion into the east basin, would affect both the low-marsh and brackish marsh habitat that supports light-footed Ridgway's rail. The loss of habitat is an impact; however, it is not considered a substantial impact as the impact is less than 50 percent of the habitat and the remaining habitat can support the existing population of light-footed Ridgway's rail. The project has proposed design features to minimize impacts, including the removal of vegetation outside of the bird breeding season, use of a biological monitor, flushing techniques, and a habitat enhancement plan. **With implementation of project design features and construction monitoring, and because greater than 50 percent of breeding habitat would remain available during construction of the proposed project, short-term direct impacts on light-footed Ridgway's rail are considered less than significant and not substantially adverse (Criterion C).**



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Impacts to nonlisted shorebirds would be similar to those described under Alternative 2A and the listed species discussions above. Construction impacts would temporarily limit foraging and wintering areas for nonlisted shorebird species. **With construction phasing, impacts to nonlisted shorebirds from temporary construction are considered less than significant and not substantially adverse (Criterion C).**

INDIRECT

Indirect short-term/temporary effects may include increases in exposure to predators, degraded water quality, disturbed unconsolidated sediment, lighting, and noise. These impacts are identical to those described for Alternative 2A.

Species may be exposed to higher predation as they would be more concentrated in the remaining unimpacted habitat, much of which is lower condition. To reduce temporary impacts to marsh birds resulting from the indirect effects of the short-term loss of nesting and foraging habitat, the project has included a variety of design features, including preparation and implementation of a habitat enhancement plan and a predator control program, as described for Alternative 2A.

During construction, sensitive birds using the lagoon may be exposed to degraded water quality resulting from dredging and other sediment-disturbing activities. These impacts are expected to be localized to the active dredge area and are not expected to substantially affect sensitive bird species. In addition, the project would implement BMPs to further reduce water quality impacts and the indirect effects to sensitive birds (see Section 3.4 Water and Aquatic Sediment Quality). Dredging activities may also facilitate foraging as benthic organisms are disturbed and released into the water column increasing foraging success for birds.

With implementation of project design features, temporary indirect impacts to sensitive species from predation, water quality, noise, and unconsolidated sediment are considered less than significant and not substantially adverse (Criterion C).

Indirect noise impacts associated with Alternative 1B would be similar to those described in Alternative 2A. The construction (dredging and inundation) footprint for Alternative 1B is similar to Alternative 2A. The total footprint for Alternative 1B is larger than Alternative 2A by 3.2 acres; however, the grading-only footprint is 15.9 acres smaller. The overall construction approach is the same for both alternatives, including the potential use of a diesel dredge and other large construction equipment; as such, temporary impacts from noise to listed species would be similar to impacts previously described. **Similar to Alternative 2A, short-term noise**

effects on sensitive birds from construction would result in a significant and adverse impact (Criterion C).

As with Alternative 2A, noise from increased vehicular traffic associated with construction of Alternative 1B may also occur. As with Alternative 2A, one vehicle route coincides with sensitive birds at the southwest entry point in the central basin where vehicles would enter off of North Rios Avenue and travel west into the lagoon. **Noise impacts to birds from vehicular traffic are therefore considered less than significant and not substantially adverse (Criterion C).**

Long-Term/Permanent

DIRECT

Direct long-term/permanent effects include the active conversion of nesting and/or foraging habitat to another habitat type, modified lagoon conditions, and long-term maintenance and operation.

Habitat for sensitive species would be changed and/or converted as a result of the proposed restoration project. This change may include a direct increase or decrease in the total acreage of a specific habitat type post-restoration. This change may be a result of grading or attributed to the modified hydrology and the elevated high tide line. The direct permanent changes to suitable habitat for sensitive species are summarized in Table 3.6-11. Implementation of Alternative 1B would extend tidal hydrology to the east basin and result in a modified high tide line of +3.9 feet NGVD, which is higher than the existing high tide line of +3.5 feet NGVD.

Both least Bell's vireo and southwestern willow flycatcher utilize riparian habitat on-site for foraging habitat. Both species are not known to breed on-site but there is the potential that successful vireo breeding has occurred. As with Alternative 2A, Alternative 1B would actively convert 5 percent of the southern willow scrub habitat and 1 percent of sandbar willow scrub as a result of the expansion of tidal channels in the east basin and widening of tidal channels in the central basin (Table 3.6-11). The loss of less than 3 acres (4 percent) of riparian habitat is not substantial and would not result in a decline in the local populations of least Bell's vireo and southwestern willow flycatcher below self-sustaining levels. **Therefore, impacts are considered less than significant and not substantially adverse (Criterion C).**

Coastal California gnatcatcher are observed along the periphery of San Elijo Lagoon within the sage scrub and chaparral habitats. Enhancement of the access road off North Rios Avenue could permanently impact 0.7 acre of occupied habitat, although the intent is to conduct activities

**Table 3.6-11
Alternative 1B Existing and Post-Construction Acreage of Suitable Habitat for Listed Bird Species**

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Habitat Acreage Post-Restoration	Net Change in Habitat Acreage Post-Restoration	Percent Change Post-Restoration
light-footed Ridgway's rail	Nesting/Foraging	Coastal Brackish Marsh	131.5	99	-32.5	-25%
		Coastal Salt Marsh – Low	13.3	51	37.7	283%
	Foraging	Total Nesting	144.8	150	5.2	4%
		Mudflats	63.1	71	7.9	13%
		Coastal Salt Marsh – Mid	141.4	98	-43.4	-31%
		Coastal Salt Marsh – High	120	124	4	3%
California least tern	Nesting	Total Foraging	324.5	293	-31.5	-10%
		Salt Panne	36.9	30	-6.9	-19%
		Coastal Strand	5	5	0	0%
		Nesting Area**	0	2	2	200%
		Total Nesting	41.9	37	-4.9	-12%
		Subtidal/Channels	40.1	67	26.9	67%
western snowy plover	Foraging	Beach	15	15	0	0%
		Total Foraging	55.1	82	26.9	49%
	Nesting	CDFW Dike	0.4	0	-0.4	-100%
		Salt Panne	36.9	30	-6.9	-19%
		Coastal Strand	5	5	0	0%
		Nesting Area**	0	2	2	200%
coastal California gnatcatcher	Foraging	Total Nesting	42.3	37	-5.3	-13%
		Mudflats	63.1	71	7.9	13%
	Nesting/Foraging	Beach	15	15	0	0%
		Total Foraging	78.1	86	7.9	10%
		Diegan Coastal Sage Scrub	178.1	173.5	-4.6	-3%
		Diegan Coastal Sage Scrub/Chaparral	49.3	49.3	0	0%
		Coyote Bush Scrub	7.5	7.5	-0.02	0%

3.6 Biological Resources

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Habitat Acreage Post-Restoration	Net Change in Habitat Acreage Post-Restoration	Percent Change Post-Restoration
least Bell's vireo	Nesting/Foraging	Total Nesting/Foraging	234.9	230.28	-4.62	-2%
		Sandbar Willow Scrub	9	9	-0.06	-1%
		Southern Willow Scrub	61.4	58.5	-2.9	-5%
		Total Nesting/Foraging	70.4	67.44	-2.96	-4%
southwestern willow flycatcher	Nesting/Foraging	Southern Willow Scrub	61.4	58.5	-2.9	-5%
		Total Nesting/Foraging	61.4	58.5	-2.9	-5%
		Coastal Salt Marsh – Mid	141.4	98	-43.4	-31%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – High	120	124	4	3%
		Total Nesting	261.4	222	-39.4	-15%
		Coastal Salt Marsh – Low	13.3	51	37.7	283%
	Foraging	Total Foraging	13.3	51	37.7	283%

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as “foraging” is not expected to support breeding activities.

**Under existing conditions, a portion of the nesting area is classified as salt panne.

within the existing road alignment, with the exception of focused widening along the trail to access the created transitional area. This impact, along with the additional 1.2 acres of coastal sage scrub habitat impacted within the lagoon, equates to 1 percent of the total potential nesting habitat on-site. As the gnatcatcher is not occurring at high densities, the loss of 1 percent of their nesting habitat would not preclude the species from nesting as they have historically. Permanent impacts to gnatcatcher habitat associated with the road enhancement and lagoon restoration are not substantial and would not result in a decline in the local population below self-sustaining levels. **Therefore, impacts are considered less than significant and not substantially adverse (Criterion C).**

Both California least tern and western snowy plover are documented annually, foraging and roosting at San Elijo Lagoon. Western snowy plover has not successfully nested at San Elijo Lagoon since 2002, and California least tern since 2005 (CDFG 2006; Patton 2010). Impacts to suitable nesting habitat from Alternative 1B would be less than Alternative 2A. Primary differences between the alternatives include 13 fewer acres of long-term impacts on salt panne habitat and 7 fewer acres of impact to subtidal/channel habitat under Alternative 1B. Alternative 1B would permanently decrease suitable nesting habitat for California least tern by 4.9 acres (12 percent of suitable nesting habitat) and decrease suitable nesting habitat for western snowy plover by 5.3 acres (13 percent of suitable nesting habitat) (Table 3.6-10). As neither species currently breeds on-site, the loss of nesting habitat does not substantially affect either species. In addition, implementation of a predator control program may also improve conditions of remaining suitable nesting habitat. Furthermore, both species are expected to benefit from restoration of the lagoon, including increased acreage and improved condition of foraging habitat. Implementation of Alternative 1B would directly benefit these species. **Therefore, no significant or substantially adverse impacts would occur (Criterion C).**

As depicted in Table 3.6-11, Alternative 1B would reduce available nesting habitat for Belding's savannah sparrow by 39.4 acres, which equates to a loss of 15 percent compared to existing conditions. The loss of Belding's nesting habitat associated with Alternative 1B is 9 acres (3 percent) more than Alternative 2A. The greatest reduction in habitat is within the central basin where mid-marsh is being replaced with mudflat habitat. This reduction in nesting habitat would not result in a substantial decline in the local population below self-sustaining levels as Belding's are known to modify their densities and territory size based on natural annual variations in habitat availability as well as improved habitat conditions such as observed at Bolsa Chica (Zemba et al. 1988; CDFG 2010). In addition, the changes to lagoon hydrology would increase the condition of the remaining foraging and nesting habitat suitable for Belding's. While the project would result in an overall reduction in available nesting habitat of 15 percent, the improved conditions for the remaining 222 acres of mid- and high-marsh habitat resulting from the restoration outweigh the impact associated with the loss of habitat acreage. **Implementation**

of Alternative 1B would ultimately benefit the Belding's savannah sparrow population at San Elijo Lagoon and long-term direct impacts are considered less than significant and not substantially adverse (Criterion C).

Light-footed Ridgway's rail nesting and foraging habitat would be modified as part of Alternative 1B. Post-restoration, there would be a small gain of nesting habitat acreage for light-footed Ridgway's rail by 5.2 acres, which equates to a gain of 4 percent when compared to existing conditions. This increase in acreage is a combination of change associated with the loss of coastal brackish marsh and the gain of low-marsh. The greatest change is within the east basin where brackish marsh is being replaced by subtidal and low-marsh habitat. Although brackish marsh is being reduced by 32.5 acres (25 percent), the preferred habitat of light-footed Ridgway's rail is considered low-marsh, which is currently limited in the lagoon. Alternative 1B would result in an increase in the low-marsh from the current 13.3 acres to 51 acres, an increase of 37.7 acres. Under Alternative 1B, the expansion of preferred habitat (compared to existing conditions) would occur in the central and east basins. In addition to affecting habitat acreage, the changes to lagoon hydrology under Alternative 1B would improve the condition of the remaining foraging and nesting habitat for light-footed Ridgway's rail. Foraging habitat would also be affected by Alternative 1B, with a small net increase in acreage but a larger improvement in condition. 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 light-footed Ridgway's rail population within the lagoon. **Ultimately, the project would benefit light-footed Ridgway's rail populations at San Elijo Lagoon; therefore, long-term direct impacts are considered less than significant and not substantially adverse (Criterion C).**

Impacts to nonlisted shorebirds would be similar to those described under Alternative 2A. Improved water quality and hydrologic conditions, as well as the targeted balance of habitats associated with Alternative 1B, including an increase in mudflats, would provide substantial benefit to foraging and wintering shorebirds. **Therefore, impacts to nonlisted shorebirds with implementation of Alternative 1B are considered less than significant and not substantially adverse (Criterion C).**

As part of the restoration project, there would be long-term monitoring and maintenance, which has the potential to impact sensitive birds in the lagoon. **Avoidance measures, such as performing work outside of the nesting season and/or pre-construction nesting surveys, would be included in the adaptive management program, as described in Section 2.11. As such, long-term monitoring and maintenance is not expected to have a substantial effect on any sensitive species and impacts are considered less than significant and not substantially adverse (Criterion C).**

With implementation of project design features and the net benefits of the restoration project, permanent direct impacts to sensitive species from active conversion of nesting and/or foraging habitat, modified lagoon conditions, and long-term maintenance and operation are considered less than significant and not substantially adverse (Criterion C).

INDIRECT

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

Habitat above the high tide line, within the transitional area, may passively transition (change) over a long period of time. The transitional area is considered to begin at the high tide line and extend up to 2+ feet above the high tide line. For Alternative 1B, this area is found between +3.9 feet NGVD and +5.9 feet NGVD. As a result of Alternative 1B, the transitional area would include created and existing natural areas. Passive transition of habitat within the new natural transitional area is possible although unpredictable. Over time, this area may change from brackish marsh and salt panne habitat to salt marsh habitat. Although the change in habitat is unpredictable in the transitional area, the connection to tidal hydrology and the improved freshwater export are expected to ultimately enhance the condition of the existing habitat within the east basin transitional area. **Indirect impacts to sensitive species resulting from changes to the new transitional area are less than significant and not substantially adverse (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-construction habitat monitoring and maintenance program for this project, the occurrence of these invasive species would be closely monitored and maintenance would regularly include treatments to limit the possibility of invasion. Indirect impacts to sensitive species resulting from invasive species are not considered substantial.

As described for Alternative 2A, indirect changes to lagoon condition are expected as a result of Alternative 1B and the corresponding improvement to water quality and tidal hydrology (i.e., lower eutrophication; increased circulation, turn over, freshwater export, etc.). The indirect improvement to water quality would benefit sensitive species.

With implementation of project design features and the net benefits of the restoration project, indirect permanent impacts to sensitive species from passive transition of nesting and/or foraging habitat and invasive species are considered less than significant and not substantially adverse for Alternative 1B (Criterion C).

Wildlife Corridors/Connectivity

Alternative 1B would have similar temporary and short-term impacts to wildlife corridors and connectivity as discussed under Alternative 2A. The lagoon would still function as a large area of natural open space that would allow for wildlife movement and connectivity similar to existing conditions. **Therefore, no significant or adverse short-term or long-term impacts to wildlife movements or connectivity are anticipated with implementation of Alternative 1B (Criterion D).**

Local Ordinances/Policies/Adopted Plans

Similar to Alternative 2A, restoration, maintenance and monitoring plans prepared for Alternative 1B would be prepared in accordance with the goals and objectives of the MHCP and draft North County MSCP, and in consultation with the wildlife agencies. **Therefore, no significant or substantially adverse impact would result with implementation of Alternative 1B (Criterion E).**

Alternative 1A

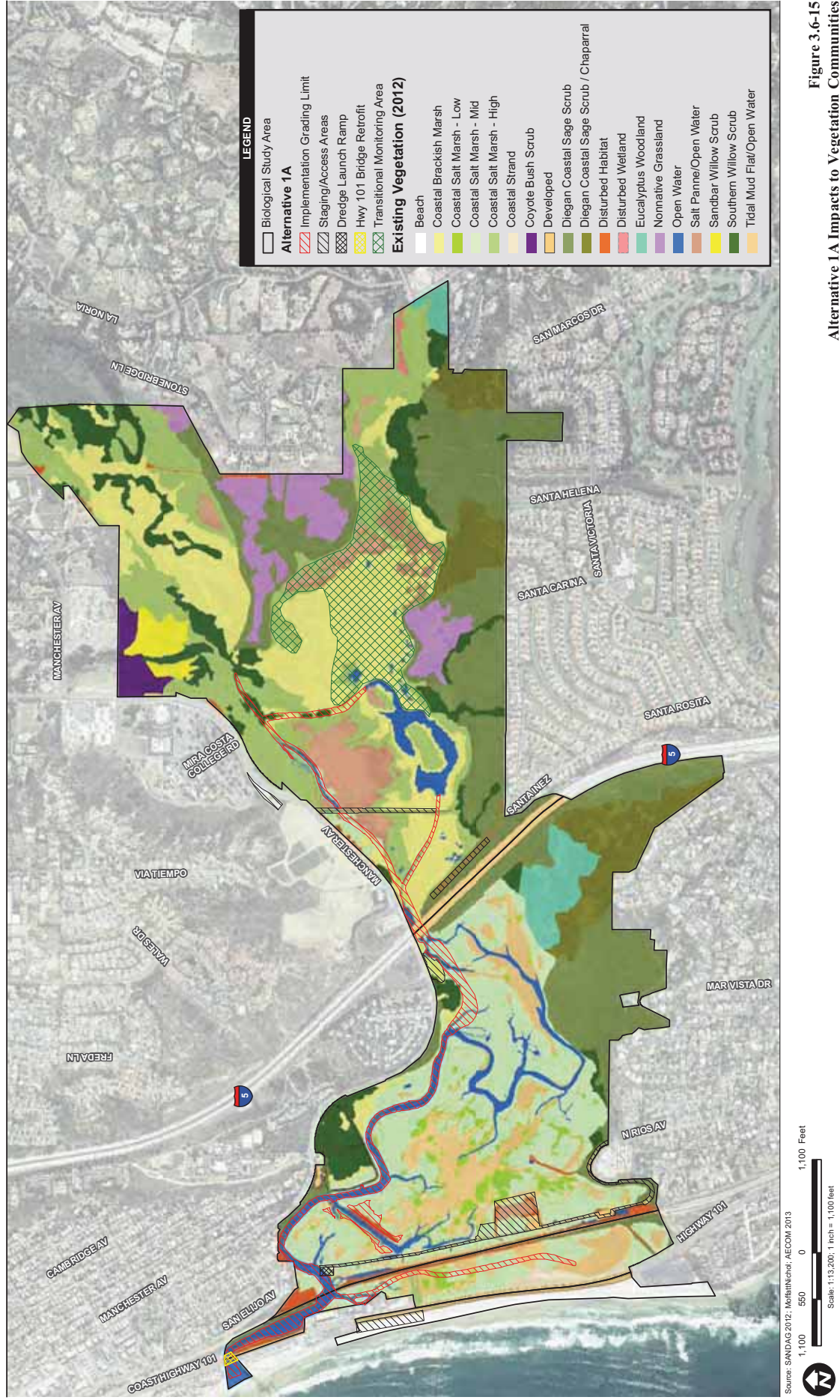
Sensitive Riparian and Natural Vegetation Communities

Short-Term/Temporary

Construction of Alternative 1A would result in fewer short-term/temporary impacts to sensitive habitats as compared to Alternative 2A and Alternative 1B. Alternative 1A would be constructed in a single phase of approximately 9 months and would not involve inundation. The total acreage by habitat community that would be directly impacted during construction is shown in Table 3.6-12. Alternative 1A would result in impacts to approximately 51 acres (approximately 5 percent) of habitat within the BSA (Figure 3.6-15).

Temporary impacts to habitat communities associated with construction of Alternative 1A are not considered significant or substantially adverse because greater than 50 percent of the local habitat would remain available to local resident and migratory species during construction (Criterion A).

No direct impacts are proposed to coastal strand, coyote bush scrub, Diegan coastal sage scrub/chaparral, disturbed wetland, eucalyptus woodland, nonnative grassland, and sandbar willow scrub.



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Table 3.6-12
Direct Project Impacts from Construction of Alternative 1A

Basin/Habitat Community	Existing Vegetation (acreage) within the BSA	Alternative 1A Direct Impacts from Dredging/Grading (acres)	Habitat Temporarily Impacted (% in BSA)
Beach	15	2.1	14%
Coastal Brackish Marsh	131.5	4.9	4%
Coastal Salt Marsh – High	120	2.3	2%
Coastal Salt Marsh – Low	13.3	0.3	2%
Coastal Salt Marsh – Mid	141.4	11.4	8%
Coastal Strand	5	0	0%
Coyote Bush Scrub	7.5	0	0%
Developed	23.4	5.3	23%
Diegan Coastal Sage Scrub	178.2	1.9	1%
Diegan Coastal Sage Scrub/Chaparral	49.3	0	0%
Disturbed Habitat	11.9	2	17%
Disturbed Wetland	1.1	0	0%
Eucalyptus Woodland	19.1	0	0%
Nonnative Grassland	33.1	0	0%
Open Water	40.1	15	37%
Salt Panne/Open Water	37	2	5%
Sandbar Willow Scrub	8.9	0	0%
Southern Willow Scrub	61.3	1.4	2%
Tidal Mud Flat/Open Water	63.1	2.3	4%
Grand Total	960.2	50.9	5%

USFWS Critical Habitat

Impacts to USFWS critical habitat for western snowy plover would be similar or less than the impacts of Alternative 1B and Alternative 2A. Similar to Alternative 1B and Alternative 2A, no new impacts to coastal California gnatcatcher critical habitat would result from restoration construction. Temporary impacts to western snowy plover critical habitat for Alternative 1A are limited to the east basin, with 5 acres of impacts (ultimately restored). As the critical habitat designation itself for this area is based on future restored conditions, these impacts are considered less than significant. **Therefore, impacts would be considered less than significant and not substantially adverse (Criterion A).**

Essential Fish Habitat

Construction of Alternative 1A would result in similar temporary impacts to EFH associated with grading and dredging operations as discussed for Alternative 2A and Alternative 1B. However, this alternative has the smallest amount of construction proposed; therefore, it would result in fewer temporary impacts to EFH compared to the other alternatives. **No significant or**

substantially adverse impacts to EFH are anticipated with implementation of Alternative 1A (Criterion A).

Indirect Impacts

Short-term indirect impacts associated with Alternative 1A would be less than Alternative 2A and Alternative 1B as the total acreage of impact is much smaller relative to the other alternatives. **No significant or substantially adverse indirect impacts to vegetation communities would result with project implementation (Criterion A).**

Long-Term/Permanent

Long-term changes in vegetation (5–10 years post-restoration) would occur from implementation of Alternative 1A, as shown in Table 3.6-6 and Figure 2-9. Within 5–10 years following restoration, habitats are expected to have substantially recovered and matured. The overall acreage of sensitive habitats within the lagoon would remain approximately 960 acres. However, changes between sensitive vegetation communities (e.g. mudflat to low marsh) in the lagoon would occur with dredging, grading, and improvements to water quality and hydrologic function.

Alternative 1A proposes modest change to existing conditions within the lagoon. This alternative emphasizes enhancement of existing tidal channels and creation of new tidal channels, providing increased tidal flows in the three lagoon basins. Alternative 1A would use the existing tidal inlet, create a north-south-trending tidal channel in the west basin, create a new channel linking the central basin and the east basin beneath I-5, and enhance existing tidal channels in the east basin.

Retention of the current inlet location combined with minimal grading would result in a slight increase in tidal prism and tidal range compared to existing conditions. This slight increase may result in improved water quality throughout the lagoon, and an increase in the area of tidally influenced habitats. A portion of the central basin currently functioning as intertidal mudflat would continue to transition to mid-salt marsh under this alternative due to relatively high site elevations combined with minimal grading and better tidal drainage, which leads to less frequent tidal inundation of existing mudflats.

Alternative 1A differs substantially from Alternative 1B and Alternative 2A, when comparing changes in habitats over existing conditions. With implementation of Alternative 1A, mudflat and open water/channels/basins would substantially decrease over existing conditions. Creation of transitional habitats would be limited to 2 acres. Under Alternative 1A, salt marsh would substantially increase over existing conditions. Salt panne, freshwater/brackish marsh, and riparian habitats would be negligibly reduced. As with each of the alternatives, the overall

acreage of habitat available for sensitive species would remain unchanged with this alternative. In addition, habitats that remain unchanged are expected to benefit from the improved hydrologic function of the lagoon. As described in Chapter 1, the lagoon habitat is rapidly transitioning over time, with continued loss of mudflat and rapid increase in salt marsh. With rapid transition to salt marsh, there is a reduction in available foraging habitat for sensitive and nonsensitive birds, which has the potential for significant ecological changes in the lagoon and is expected to dramatically change the diversity and density of wildlife that the lagoon can continue to support. With implementation of Alternative 1A, the project would result in slightly improved hydrologic function, but it would not increase foraging habitat or reverse the rapid changes that are occurring under existing conditions. Species-specific impacts associated with the changes proposed under Alternative 1A are evaluated below. **With improved lagoon ecology and no overall loss of lagoon resources, impacts to sensitive vegetation communities with project implementation of Alternative 1A are considered less than significant and not substantially adverse (Criterion A).**

Long-term indirect changes to the vegetation communities may occur as a result of restoration activities. Restoration would improve water quality, which is expected to have a positive effect on the lagoon. Less change to vegetation communities is expected under Alternative 1A as compared to Alternative 2A and Alternative 1B. Regardless, changes in habitat are anticipated to be neutral or beneficial to the lagoon and are therefore considered **less than significant and not substantially adverse (Criterion A).**

USFWS Critical Habitat

No long-term impacts to USFWS critical habitat are anticipated for western snowy plover. The quality of western snowy plover habitat would be improved with the proposed construction of Alternative 1A, as described in the Sensitive Species section, below. No long-term loss of critical habitat is anticipated with project restoration. No new or permanent impacts would occur to coastal California gnatcatcher critical habitat as a result of this project. Impacts associated with the I-5 North Coast Corridor Project would be mitigated via that project. **Therefore, no long-term significant or substantially adverse impacts to designated critical habitat are anticipated with implementation of Alternative 1A (Criterion A).**

Essential Fish Habitat

Construction of Alternative 1A would result in similar long-term beneficial impacts to EFH as discussed under Alternative 2A and Alternative 1B. This alternative would create additional acreages of open water, tidal channels, and/or mudflat habitat, as well as enhance conditions of existing subtidal habitat by increasing tidal influence within the lagoon. Although lesser amounts

of subtidal habitat would be created under this alternative compared to the other alternatives, this additional acreage of habitat would still benefit EFH. **No long-term significant or substantially adverse impact to EFH is anticipated with implementation of Alternative 1A (Criterion A).**

Jurisdictional Waters and Wetlands

The short-term temporary and long-term permanent impacts resulting from the implementation of Alternative 1A would be smaller than those discussed for Alternative 2A and Alternative 1B, due to the reduction in area impacted by construction under this alternative (Table 3.6-12 and 3.6-11). Of the approximately 620 acres of wetlands, approximately 37.8 acres would be directly impacted by construction.

The amount of jurisdictional waters and wetlands are expected to be similar to existing conditions following implementation of Alternative 1A. However, Alternative 1A would result in up to 2 acres of permanent impacts to jurisdictional waters and wetlands of the U.S. and state due to the construction of the transitional habitat within the central basin. This small amount of permanent loss would be immediately offset by the enhanced wetland conditions and increased diversity of jurisdictional waters and wetlands within the lagoon. For example, the main tidal channel would be extended farther into the east basin, and existing constricted channel connections would be cleared and enlarged allowing for an increase in tidal influence compared to existing conditions. **The short-term and long-term (direct and indirect) impacts resulting from the implementation of Alternative 1A would be less than those discussed for Alternative 2A and are considered less than significant (Criterion B).**

Sensitive Species

Flora

No federally or state-listed rare, threatened, or endangered plant species occur within the areas proposed for restoration. As with Alternative 2A and Alternative 1B, Del Mar manzanita and Orcutt's goldenbush occur in uplands habitat and would not be affected by the proposed project.

Approximately three individuals of southwestern spiny rush (CNPS List 4.2) are within the grading limits of Alternative 1A and would be directly impacted. As noted in Alternative 2A and Alternative 1B, this direct impact is not considered significant, given that several hundred individuals are scattered throughout the mid- and high-salt marsh habitats within the lagoon. The large population of southwestern spiny rush is expected to persist within the lagoon, as the majority of the mid- and high-salt marsh habitats would remain intact. **Therefore, no significant or substantially adverse impacts to sensitive plant populations are anticipated with construction of Alternative 1A (Criterion C).**

Fauna

There is the potential for both short-term/temporary effects as well as long-term/permanent effects associated with the implementation of Alternative 1A. These effects may be considered negative (impact) or positive (benefit) and both are discussed related to the seven state and/or federally listed species described for Alternative 2A.

SHORT-TERM/TEMPORARY

DIRECT

Direct short-term/temporary effects may include the short-term loss of nesting and/or foraging habitat as well as noise impacts as a result of construction activities.

Impacts resulting from Alternative 1A would be similar in nature to Alternative 2A, but to a much lesser extent. Alternative 1A requires the least grading, with 50.9 acres of the habitat within the 960 acre BSA (5 percent) directly impacted as part of restoration grading activities. This alternative was designed to minimize impacts to existing habitat while increasing tidal circulation to the east basin. As part of the restoration effort, nesting or foraging habitat would be temporarily impacted (i.e., graded or dredged) during construction, which may affect listed species that use the lagoon and rely on this habitat. Table 3.6-13 presents the temporary impacted acreages and post-restoration acreages of suitable habitat for the evaluated listed species, including nesting and foraging habitat. Unlike Alternative 2A and Alternative 1B, Alternative 1A would not be phased but would occur over a single 9-month time period. Within that single period, construction activities would still be phased so that across the three lagoon basins some habitat areas would be preserved at any given time. This would allow for species refugia during construction. In addition, vegetation removal activities would be restricted to outside of the nesting season.

Short-term direct impacts to both least Bell's vireo and southwestern willow flycatcher as a result of Alternative 1A are less than those described for Alternative 2A and Alternative 1B as long periods of controlled inundation are not required for construction. Both species have been observed in low numbers foraging primarily within the southern willow scrub habitat. Construction of Alternative 1A would directly impact 1.4 acres (2 percent) of the southern willow scrub riparian habitat within the lagoon as a result of grading (Table 3.6-13). As vegetation would be removed outside of the breeding season and both species use the site primarily for foraging during summer months, the short-term impact to 2 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. **Therefore, short-term direct impacts to least Bell's**

Table 3.6-13
Alternative 1A Impact Acreage of Suitable Habitat for Listed Bird Species

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Total Acres Existing Habitat Directly Impacted by Grading***	Percent Existing Habitat Directly Impacted
light-footed Ridgway's rail	Nesting	Coastal Brackish Marsh	131.5	4.9	4%
		Coastal Salt Marsh – Low	13.3	0.4	3%
	Foraging	Total Nesting	144.8	5.3	4%
		Mudflats	63.1	2.3	4%
		Coastal Salt Marsh – Mid	141.4	11.4	8%
California least tern	Nesting	Coastal Salt Marsh – High	120	2.3	2%
		Total Foraging	324.5	16	5%
		Salt Panne	36.9	2	5%
		Coastal Strand	5	0	0%
		Nesting Area**	0	0	0%
		Total Nesting	41.9	2	5%
		Subtidal/Channels	40.1	14.3	36%
	Foraging	Beach	15	0	0%
		Total Foraging	55.1	14.3	26%
		CDFW Dike	0.4	0.4	100%
		Salt Panne	36.9	2	5%
		Coastal Strand	5	0	0%
western snowy plover	Nesting	Nesting Area**	0	0	0%
		Total Nesting	42.3	2.4	6%
		Mudflats	63.1	2.3	4%
	Foraging	Beach	15	0	0%
		Total Foraging	78.1	2.3	3%

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Total Acres Existing Habitat Directly Impacted by Grading***	Percent Existing Habitat Directly Impacted
coastal California gnatcatcher	Nesting/Foraging	Diegan Coastal Sage Scrub	178.1	1.9	1%
		Diegan Coastal Sage Scrub/Chaparral	49.3	0	0%
		Coyote Bush Scrub	7.5	0	0%
		Total Nesting/Foraging	234.9	1.9	1%
least Bell's vireo	Nesting/Foraging	Sandbar Willow Scrub	9	0	0%
		Southern Willow Scrub	61.4	1.4	2%
		Total Nesting/Foraging	70.4	1.4	2%
southwestern willow flycatcher	Nesting/Foraging	Southern Willow Scrub	61.4	1.4	2%
		Total Nesting/Foraging	61.4	1.4	2%
		Coastal Salt Marsh – Mid	141.4	11.4	8%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – High	120	2.3	2%
		Total Nesting	261.4	13.7	5%
	Foraging	Coastal Salt Marsh – Low	13.3	0.4	3%
		Total Foraging	13.3	0.4	3%

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as “foraging” is not expected to support breeding activities.

**Under existing conditions a portion of the nesting area is classified as salt panne.

*** Please note that no temporary inundation impacts are associated with Alternative 1A as extensive controlled inundation would not be required.

vireo and southwestern willow flycatcher would be less than significant and not substantially adverse (Criterion C).

Coastal California gnatcatcher are observed along the periphery of San Elijo Lagoon within the sage scrub and chaparral habitats. As described under Alternative 2A, an access road along the southwest corner of the central basin would be improved to accommodate construction vehicular traffic. There is the potential to impact nesting coastal California gnatcatcher in this area during vegetation removal. To avoid this potential impact, vegetation would be cleared outside of the bird nesting season, when birds are highly mobile. A monitor would be used to flush birds out in front of equipment. Temporary impacts to gnatcatcher are not considered substantial and would not result in a decline in the local population below self-sustaining levels. **Therefore, impacts are considered less than significant and not substantially adverse (Criterion C).**

Impacts to both California least tern and western snowy plover are similar to those described for Alternative 2A, including impacts to foraging habitat for both species as a result of grading and habitat conversion (Table 3.6-13). Impacts to potential nesting habitat is minimal with 2 acres of salt panne and a small portion (0.4 acre) of the CDFW dike impacted. Short-term direct impacts would occur on 2 acres of mudflat (foraging habitat for western snowy plover) and 14.3 acres of subtidal/channels (foraging habitat for California least tern). These impacts to foraging habitat would be phased across the three lagoon basins, and within each basin, so that contiguous areas of foraging habitat would remain at any given time. Unlike Alternative 2A and Alternative 1B, phasing would occur over a shorter period of time as construction would take 9 months instead of 3 years. Although short-term impacts to foraging habitat would occur, short-term benefits are also expected as lagoon conditions improve. The improved conditions would result in higher productivity in the subtidal habitat and direct benefits to birds that forage on them, such as the California least tern and other diving birds. **Direct short-term/temporary impacts from Alternative 1A to least tern and western snowy plover would be less than significant and not substantially adverse (Criterion C).**

Under Alternative 1A, impacts to Belding's savannah sparrow would be similar to Alternative 2A (although fewer) with direct impacts to nesting and foraging habitat. Impact acreages are presented in Table 3.6-12. Alternative 1A would impact 11.4 acres of mid-marsh and 2.3 acres of high-marsh habitat across the three basins (Figure 3.6-16). A total of 13.7 acres out of 261.4 acres (5 percent) of suitable nesting habitat for Belding's savannah sparrow would be directly impacted. The loss of habitat is an impact; however, it is not considered a substantial impact (i.e., greater than 50 percent of the habitat or greater than 50 percent of the population) to the existing population of Belding's savannah sparrow. The project would further minimize impacts by removing vegetation outside of the breeding season, using a biological monitor to direct construction crews in avoiding/minimizing impacts, and completing habitat enhancement plan

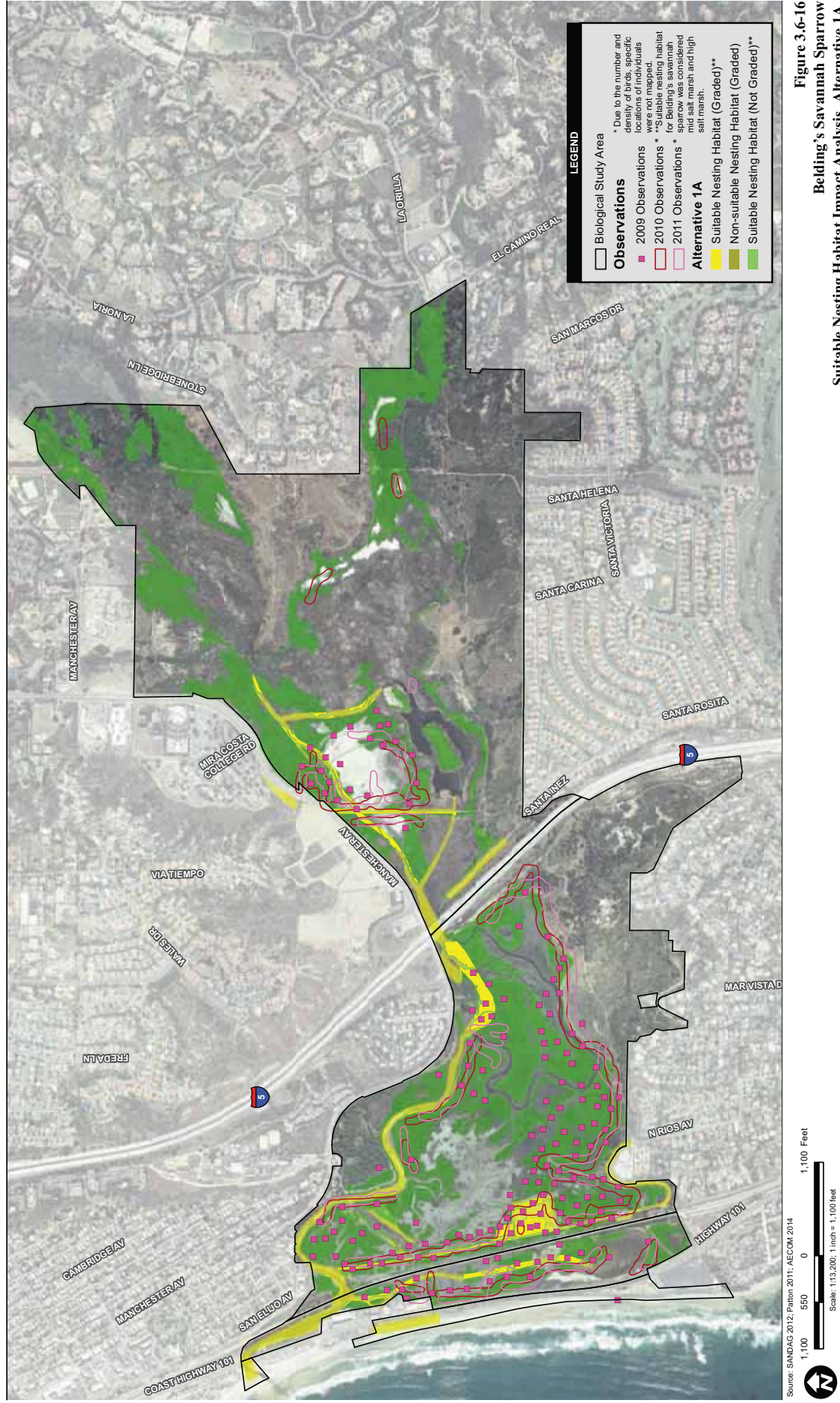


Figure 3.6-16
 Belding's Savannah Sparrow
 Suitable Nesting Habitat Impact Analysis, Alternative 1A

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(PDF-12, PDF-13, and PDF-21). **Direct short-term/temporary impacts from Alternative 1A to Belding's savannah sparrow would be less than significant and not substantially adverse (Criterion C).**

Short-term/temporary direct impacts to light-footed Ridgway's rail from implementation of Alternative 1A would be similar but substantially less than Alternative 2A, including direct impacts to 5.3 acres (4 percent) of existing suitable nesting habitat (Table 3.6-13 and Figure 3.6-17). These primary direct impacts are associated with the channel widening and the expansion of the channel into the east basin where light-footed Ridgway's rail occupy brackish marsh habitat. The loss of habitat is an impact; however, it is not considered a substantial impact (i.e., greater than 50 percent of the habitat or greater than 50 percent of the population) to the existing population of light-footed Ridgway's rail. The project has proposed design features to minimize impacts, including the removal of vegetation outside of the bird breeding season, use of a biological monitor, and a habitat enhancement plan (PDF-12, PDF-13, and PDF-21). **With implementation of project design features, temporary direct impacts to sensitive species from habitat loss (both nesting and foraging) are considered less than significant and not substantially adverse (Criterion C).**

Impacts to nonlisted shorebirds from Alternative 1A would be limited to a 9-month construction window and focused in the central basin. Construction impacts would temporarily limit foraging and wintering areas for nonlisted shorebird species. **With the limited construction duration and focused areas for channel improvements in the central basin, as well as continued access to other foraging/wintering habitats in the area, impacts to nonlisted shorebirds from temporary construction are considered less than significant and not substantially adverse (Criterion C).**

INDIRECT

Indirect short-term/temporary effects from Alternative 1A may include degraded water quality, disturbed unconsolidated sediment, lighting, noise, and prolonged inundation. These impacts are similar to those described for Alternative 2A (excluding increased exposure to predators) but to a lesser degree as the footprint is substantially smaller.

During construction, sensitive birds using the lagoon may be exposed to degraded water quality resulting from dredging and other sediment-disturbing activities, as well as night lighting associated with dredge operation. As with Alternative 2A and Alternative 1B, the project would shield lighting away from residents and sensitive habitat areas (PDF-7), and implement BMPs to reduce water quality impacts and the indirect effects to sensitive birds (see Section 3.4 Water and Aquatic Sediment Quality). **With implementation of project design features, temporary**

indirect impacts to sensitive species from water quality, lighting, and inundation are considered less than significant and not substantially adverse (Criterion C).

Short-term construction noise could impact sensitive species via the diesel or electric dredge and other large construction equipment. Temporary noise impacts to listed species would be similar to those previously described for Alternative 2A and Alternative 1B. However, under Alternative 1A, no impacts to the east basin would occur, and noise would be limited to the west of I-5. **Temporary indirect impacts associated with construction noise in the west basin are considered significant and substantially adverse (Criterion C).**

As with Alternative 2A, the construction vehicle route at North Rios Avenue would experience increased noise. Two coastal California gnatcatchers have been observed along this existing access route. They are accustomed to vehicular traffic in this area from other maintenance vehicles 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 and not substantially adverse (Criterion C).**

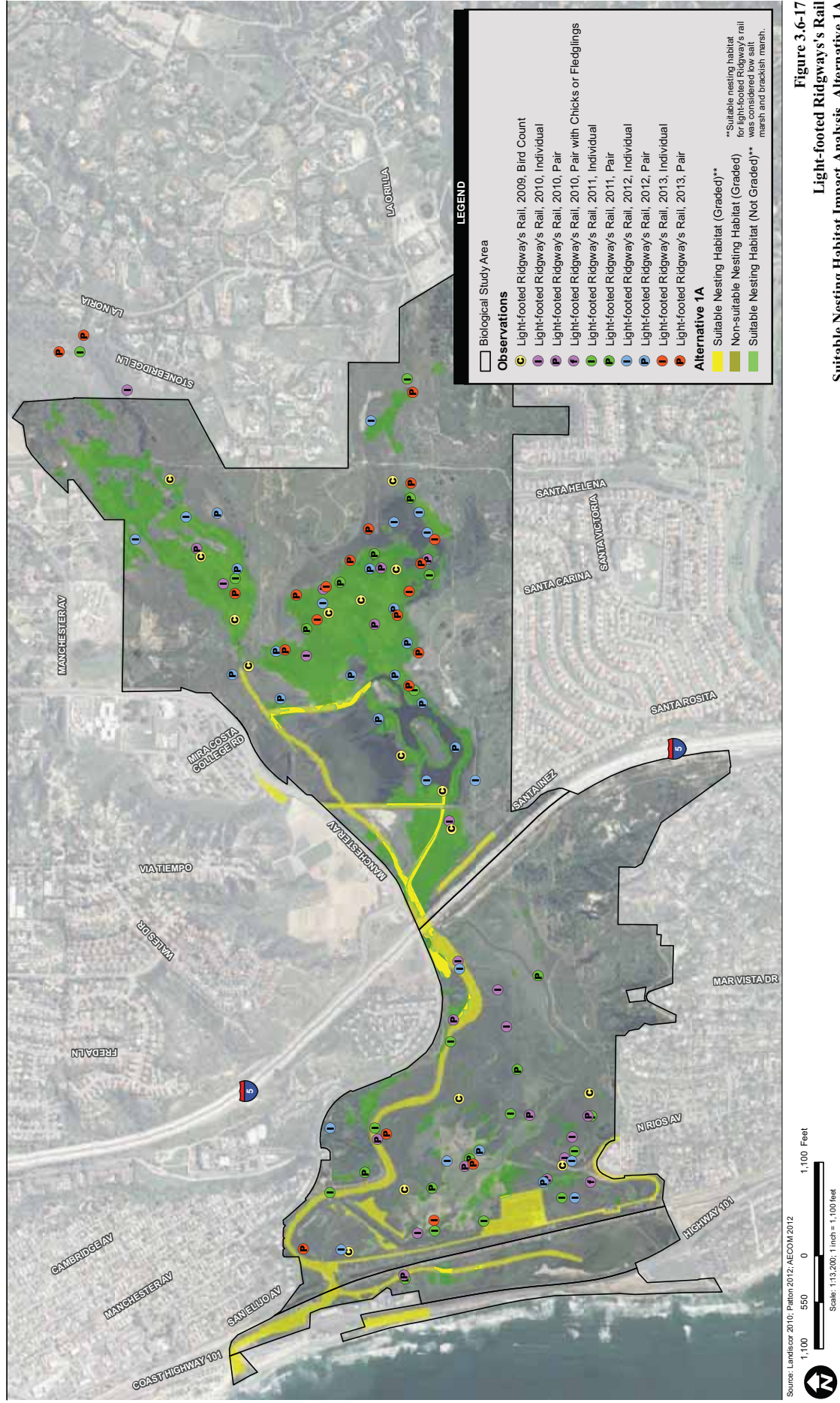
LONG-TERM/PERMANENT

DIRECT

Direct long-term/permanent effects include the active conversion of nesting and/or foraging habitat to another habitat type, modified lagoon conditions, and long-term maintenance and operation.

Habitat for sensitive species would be changed and/or converted as a result of this alternative (Table 3.6-14). This change may include a direct increase or decrease in the total acreage of a specific habitat type post-restoration. This change may result from grading, modified hydrology, or elevated high tide line. Implementation of Alternative 1A would extend tidal hydrology to the east basin and result in a modified high tide line of +3.8 feet NGVD, which is moderately higher than the existing high tide line of +3.5 feet NGVD.

Both least Bell's vireo and southwestern willow flycatcher utilize riparian habitat on-site for foraging habitat. Southwestern willow flycatcher are not known to breed on-site. Least Bell's Vireo have not been documented but there is the potential that successful breeding has occurred. Alternative 1A would actively convert 2.7 acres (4 percent) of the riparian habitat within the lagoon BSA as a result of the expansion of tidal channels in the east basin and widening of tidal channels in the central basin (Table 3.6-14). More than enough habitat would remain to support



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Table 3.6-14
Alternative 1A Existing and Post-Construction Acreage of Suitable Habitat for Listed Bird Species

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Habitat Acreage Post-- Restoration	Net Change in Habitat Acreage Post- Restoration	Percent Change Post- Restoration
light-footed Ridgway's rail	Nesting	Coastal Brackish Marsh	131.5	122	-9.5	-7%
		Coastal Salt Marsh – Low	13.3	44	30.7	231%
		Total Nesting	144.8	166	21.2	15%
	Foraging	Mudflats	63.1	25	-38.1	-60%
		Coastal Salt Marsh – Mid	141.4	140	-1.4	-1%
		Coastal Salt Marsh – High	120	145	25	21%
California least tern	Nesting	Total Foraging	324.5	310	-14.5	-4%
		Salt Panne	36.9	35	-1.9	-5%
		Coastal Strand	5	5	0	0%
		Nesting Area**	0	2	2	200%
		Total Nesting	41.9	42	0.1	0%
		Subtidal/Channels	40.1	34	-6.1	-15%
western snowy plover	Foraging	Beach	15	15	0	0%
		Total Foraging	55.1	49	-6.1	-11%
		CDFW Dike	0.4	0	-0.4	-100%
	Nesting	Salt Panne	36.9	35	-1.9	-5%
		Coastal Strand	5	5	0	0%
		Nesting Area**	0	2	2	200%
	Foraging	Total Nesting	42.3	42	-0.3	-1%
		Mudflats	63.1	25	-38.1	-60%
		Beach	15	15	0	0%
		Total Foraging	78.1	40	-38.1	-49%

3.6 Biological Resources

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Habitat Acreage Post-- Restoration	Net Change in Habitat Acreage Post- Restoration	Percent Change Post- Restoration
coastal California gnatcatcher	Nesting/Foraging	Diegan Coastal Sage Scrub	178.1	178.1	0	0%
		Diegan Coastal Sage Scrub/Chaparral	49.3	49.3	0	0%
		Coyote Bush Scrub	7.5	7.5	0	0%
		Total Nesting/Foraging	234.9	234.9	0	0%
least Bell's vireo	Nesting/Foraging	Sandbar Willow Scrub	9	8.9	-0.06	-1%
		Southern Willow Scrub	61.4	58.8	-2.7	-4%
		Total Nesting/Foraging	70.4	67.7	-2.7	-4%
		Southern Willow Scrub	61.4	58.8	-2.7	-4%
southwestern willow flycatcher	Nesting/Foraging	Total Nesting/Foraging	61.4	58.8	-2.7	-4%
		Coastal Salt Marsh – Mid	141.4	124	-17.4	-12%
		Coastal Salt Marsh – High	120	145	25	21%
		Total Nesting	261.4	269	7.6	3%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – Low	13.3	44	30.7	231%
	Foraging	Total Foraging	13.3	44	30.7	231%

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as “foraging” is not expected to support breeding activities.

**Under existing conditions, a portion of the nesting area is classified as salt panne.

the low numbers of individuals that currently migrate into the lagoon. As both species are migratory, occur in low numbers, and have not been confirmed to breed on-site, the loss of 2.7 acres of riparian habitat is not substantial and would not result in a decline in the local populations of least Bell's vireo and southwestern willow flycatcher below self-sustaining levels. **Therefore, impacts to least Bell's vireo and southwestern willow flycatcher are considered less than significant and not substantially adverse (Criterion C).**

Coastal California gnatcatcher are observed along the periphery of San Elijo Lagoon within the sage scrub and chaparral habitats. As with Alternative 2A, the existing access road at North Rios would need to be widened to accommodate construction vehicular traffic. Alternative 1A would permanently impact 0.7 acre of coastal sage scrub habitat with road enhancement in addition to 1.2 acres within the lagoon equating to 1 percent of the total nesting habitat in the BSA. There would still be expansive contiguous undisturbed upland sage habitat along most lagoon hillsides. Permanent impacts to gnatcatcher habitat associated with the road enhancement and lagoon restoration would not be considered substantial because they would not result in a decline in the local population below self-sustaining levels. **Therefore impacts to coastal California gnatcatcher are considered less than significant and not substantially adverse (Criterion C).**

Both California least tern and western snowy plover are documented annually, foraging and roosting at San Elijo Lagoon. Western snowy plover has not successfully nested at San Elijo Lagoon since 2002 and California least tern since 2005 (CDFG 2006; Patton 2010). Suitable nesting habitat under Alternative 1A would remain the same for California least tern and would only negligibly decrease for western snowy plover by 0.3 acre (1 percent of suitable nesting habitat) (Table 3.6-14). **Therefore, impacts to California least tern and western snowy plover are considered less than significant and not substantially adverse (Criterion C).**

As depicted in Table 3.6-14, Alternative 1A would ultimately increase available nesting habitat for Belding's savannah sparrow by 7.6 acres, which equates to a gain of 5 percent compared to existing conditions. The greatest increase is within the central basin where mid-marsh is being replaced with high-marsh habitat. This increase in nesting habitat would be considered a benefit to the local population. Although there would be an increase in nesting acreage, Alternative 1A would have a minimal effect on lagoon condition and the increased habitat would still be of moderate quality. **Implementation of Alternative 1A would ultimately benefit the Belding's savannah sparrow population at San Elijo Lagoon and no long-term significant or substantially adverse impacts are expected (Criterion C).**

Light-footed Ridgway's rail nesting and foraging habitat would be modified as part of Alternative 1A. Post-restoration there would be a net gain of nesting habitat acreage for light-

footed Ridgway's rail by 21.2 acres, which equates to a gain of 15 percent when compared to existing conditions. The greatest increase is within the central basin where mudflat would continue to convert to low-marsh habitat. In the east basin, a portion of the existing brackish marsh (9.5 acres) would also be replaced by subtidal and low-marsh habitat. Although brackish marsh is being reduced, the preferred habitat of light-footed Ridgway's rail is low-marsh, which is currently limited in the lagoon. In addition to affecting habitat acreage, the changes to lagoon hydrology under Alternative 1A would improve the condition of the remaining foraging and nesting habitat for light-footed Ridgway's rail. Foraging habitat would have a small net decrease in total acreage (4 percent). This can be deceptive, however, as mudflat, another important foraging habitat, would decrease by 60 percent as a result of the expansion of low-marsh and mid-marsh habitat. The net gain of nesting habitat is considered a benefit; however, the reduction in a preferred foraging habitat (i.e., mudflat) would be a negative impact. Implementation of Alternative 1A would not substantially affect the sustainability of the light-footed Ridgway's rail population within the lagoon and, in fact, may ultimately benefit the population if nesting habitat (which would increase) is considered more limiting than foraging habitat (which would decrease). **Therefore, no long-term significant or substantially adverse impacts to light-footed Ridgway's rail would result with implementation of Alternative 1A (Criterion C).**

Alternative 1A proposes minimal improvements to the water quality, hydrology, and channel structure in the central basin. This alternative would not reverse the rapid transition of mudflats and would therefore not provide the same benefit to nonlisted shorebirds that would occur under Alternatives 2A and 1B. Regardless, Alternative 1A would provide hydrologic improvements and would not result in a reduction in habitat over the existing condition. **Therefore, impacts to nonlisted shorebirds with implementation of Alternative 1A are considered less than significant and not substantially adverse (Criterion C).**

As part of the implementation of Alternative 1A, there would be long-term monitoring and maintenance, which has the potential to impact sensitive birds in the lagoon. **Avoidance measures would be included in the adaptive management program. As such, long-term monitoring and maintenance is not expected to have a substantial effect on sensitive species and impacts are considered less than significant and not substantially adverse (Criterion C).**

INDIRECT

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

Habitat above the high tide line, within the transitional area, may passively transition over a long period of time. The transitional area is considered to begin at the high tide line and extend up to 2+ feet above the high tide line. For Alternative 1A, this area is found between +3.8 feet NGVD and +5.8 feet NGVD. Passive transition of habitat within the new natural transitional area is possible although unpredictable. The greatest passive habitat change would be expected in the east basin where the channel would be expanded and tidal exchange introduced. Over time, this area may change from brackish marsh and salt panne habitat to salt marsh habitat. Indirect impacts to sensitive species resulting from passive unpredictable changes to the new transitional area are not considered substantial.

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-construction habitat monitoring and maintenance program for this project, the occurrence of these invasive species would be closely monitored and maintenance would regularly include treatments to limit the possibility of invasion. Indirect impacts to sensitive species resulting from invasive species are not considered substantial.

As described for Alternative 2A, indirect changes to lagoon condition are expected as a result of Alternative 1A and the corresponding improvement to tidal hydrology (i.e., circulation, turn over, freshwater export, etc.). The magnitude of the improved conditions would be less than under either Alternative 2A or Alternative 1B as the improvement to tidal expression is smaller for Alternative 1A. The indirect improvement to water quality would benefit sensitive species.

With implementation of project design features and the net benefits of the restoration project, indirect permanent impacts to sensitive species from passive transition of nesting and/or foraging habitat and invasive species are considered less than significant and not substantially adverse (Criterion C).

Wildlife Corridors/Connectivity

Alternative 1A would have similar temporary and short-term impacts to wildlife corridors and connectivity as discussed under Alternative 2A and Alternative 1B. However, less construction is proposed under this alternative; therefore, the potential to impede wildlife movement would be less compared to the other alternatives. No long-term impacts are anticipated; the project area would continue to function not as a regional corridor, but as a large area of natural open space that would allow for wildlife movement and connectivity similar to existing conditions. **Therefore, no significant or substantially adverse impacts to wildlife movements or connectivity are anticipated with implementation of Alternative 1A (Criterion D).**

Local Ordinances/Policies/Adopted Plans

Similar to Alternative 2A, restoration, maintenance, and monitoring plans prepared for Alternative 1A 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 both the MHCP and draft North County MSCP. **Therefore, no significant or substantially adverse impact would result with implementation of Alternative 1A (Criterion E).**

No Project/No Federal Action Alternative

This alternative would not directly modify the lagoon, inlet, or Coast Highway 101, although modifications would occur by others to the NCTD Railroad and I-5. As such, temporary construction impacts would not occur. No sensitive plant or animal species detected within the project area would be directly impacted and the amount of jurisdictional waters and wetlands would not change (Criterion B). The project is, however, designed to modify the current trajectory of habitat conversion. Over the past decade, the lagoon has benefited from routine maintenance of the mouth, but it is still operating at a lower condition than possible if tidal expression were improved with restoration. Without restoration, water quality conditions and the wildlife community observed in the lagoon would continue to exist as a mid-level marine system with some diversity and richness. Given the constraints of tidal muting for the lagoon, higher diversity and increased EFH value are not expected without greater tidal expression. Under the No Project/No Federal Action Alternative, habitat conversion would continue, resulting in diminished mudflats, and affecting the balance of suitable foraging and nesting habitats within the lagoon.

This section discloses the anticipated habitat types in the future condition (at equilibrium), assuming continued management of the lagoon mouth by SELC. It also addresses how habitat conversion may affect nesting and/or foraging habitat of sensitive animal species (no sensitive plant species would be affected). These changes may be considered negative (impact) or positive (benefit); both are discussed.

Sensitive Vegetation Communities

Long-term changes in vegetation are anticipated to occur as shown in Table 3.6-15 and Figure 3.16-5. Specifically, there would be a substantial reduction in mudflat and open water/tidal channels and basins, with an increase in overall salt marsh habitat, plus increases in low- and high-marsh and a decrease in mid-marsh communities. A rapid conversion of mudflat was observed between 2010 and 2012, with a gain of 13 acres of low-marsh (cordgrass dominated)

**Table 3.6-15
Existing Habitat and No Project/No Federal Action Habitat Acreage of Suitable Habitat for Listed Bird Species**

Species	Habitat Suitability*	Habitat Type	Habitat in Acres			Percent Change
			Existing	No Project/No Federal Action	Net Change	
light-footed Ridgway's rail	Nesting	Coastal Brackish Marsh	131.5	131	-0.5	0%
		Coastal Salt Marsh – Low	13.3	51	37.7	283%
	Foraging	Total Nesting	144.8	182	37.2	26%
		Mudflats	63.1	29	-34.1	-54%
		Coastal Salt Marsh – Mid	141.4	107	-34.4	-24%
California least tern	Nesting	Coastal Salt Marsh – High	120	167	47	39%
		Total Foraging	324.5	303	-21.5	-7%
		Salt Pannes	36.9	36.9	0	0%
		Coastal Strand	5	5	0	0%
		Nesting Area**	0	0	0	0%
		Total Nesting	41.9	41.9	0	0%
		Subtidal/Channels	40.1	24	-16.1	-40%
western snowy plover	Foraging	Beach	15	15	0	0%
		Total Foraging	55.1	39	-16.1	-29%
	Nesting	CDFW Dike	0.4	0	-0.4	-100%
		Salt Pannes	36.9	36.9	0	0%
		Coastal Strand	5	5	0	0%
		Nesting Area**	0	0	0	0%
	Foraging	Total Nesting	42.3	41.9	-0.4	-1%
		Mudflats	63.1	29	-34.1	-54%
		Beach	15	15	0	0%
		Total Foraging	78.1	44	-34.1	-44%
coastal California gnatcatcher	Nesting/Foraging	Diegan Coastal Sage Scrub	178.1	178.1	0	0%
		Diegan Coastal Sage Scrub/Chaparral	49.3	49.3	0	0%
		Coyote Bush Scrub	7.5	7.5	0	0%
		Total Nesting/Foraging	234.9	234.9	0	0%

3.6 Biological Resources

Species	Habitat Suitability*	Habitat Type	Habitat in Acres			Percent Change
			Existing	No Project/No Federal Action	Net Change	
least Bell's vireo	Nesting/Foraging	Sandbar Willow Scrub	9	9	0	0%
		Southern Willow Scrub	61.4	60.4	-1	-2%
		Total Nesting/Foraging	70.4	69.4	-1	-1%
southwestern willow flycatcher	Nesting/Foraging	Southern Willow Scrub	61.4	60.4	-1	-2%
		Total Nesting/Foraging	61.4	60.4	-1	-2%
		Coastal Salt Marsh – Mid	141.4	107	-34.4	-24%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – High	120	167	47	39%
		Total Nesting	261.4	274	12.6	5%
	Foraging	Coastal Salt Marsh – Low	13.3	51	37.7	283%
		Total Foraging	13.3	51	37.7	283%

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as “foraging” is not expected to support breeding activities.

**Under existing conditions, a portion of the nesting area is classified as salt panne.

habitat and a direct loss of mudflat (Figure 2-1). Mudflat is expected to continue to decrease to 29 acres at equilibrium (net loss 34 acres) (Table 3.6-15). This loss of mudflat corresponds to an increase in low-marsh habitat (37.7 acres). In addition, 34.4 acres of mid-marsh habitat would revert to high-marsh habitat (+47 acres) and a portion of the open water on-site would revert to mudflat.

All other habitats and land cover types would remain relatively the same under the No Project/No Federal Action Alternative and the present spectrum of environmental constraints would continue to limit the quality and productivity of the lagoon. The change in habitat from one sensitive vegetation community to another sensitive vegetation community does not, in itself, represent a significant biological impact. However, the No Project/No Federal Action Alternative would not improve lagoon ecology and the lagoon would not benefit from the improved water quality and increased habitat diversity provided by the SELRP. **No significant or substantially adverse impact would result (Criterion A).**

Rare, Threatened, or Endangered Animal Species

Anticipated habitat conversion would result in a net gain of nesting habitat for both light-footed Ridgway's rail (low-marsh) and Belding's savannah sparrow (high-marsh) but a loss of critical foraging habitat for western snowy plover (mudflat) and least tern (subtidal) in addition to other migratory birds that use the lagoon for foraging habitat. There would be little to no change in habitats that occur above the high tide line; as such, no impacts to coastal California gnatcatcher, least Bell's vireo, and southwestern willow flycatcher are expected under the No Project/No Federal Action Alternative. Changes in marsh habitat from one type to another would benefit some species and impact other species. **No significant or substantially adverse impact would result (Criterion C).**

Local Ordinances/Policies/Adopted Plans

specifically represent a conflict with these plans. Efforts for preserve management and monitoring would continue consistent with the goals and objectives of these plans. **No significant or substantially adverse impact would result (Criterion E).**

Materials Disposal/Reuse

Impacts to biological resources from materials disposal/reuse may be direct or indirect. Direct impacts to marine biological resources may occur through burial or smothering of organisms during sand placement at placement sites and stockpile locations, or equipment damage to habitats or animals during construction activities. Indirect impacts may result from decreases in marine water quality associated with sand placement activities, sediment transport from the

placement site, noise from construction equipment, or interference of normal movement or behaviors of animals due to construction activities or operational effects. Direct and indirect impacts from the project on biological resources are assessed in this section.

Most effects would be similar regardless of when the project is constructed. However, some effects may vary depending on the time of year of project implementation. This is because certain areas of coastal San Diego are important breeding areas for sensitive species that are managed resources of the state or listed as endangered or threatened species under the state or federal ESAs. Impacts that may vary depending on time of year were considered in this impact assessment.

The impact assessment is organized below according to placement sites. Direct impacts are summarized and then followed by the assessment of indirect impacts. Specific issues associated with threatened and endangered species and EFH are then identified. Beneficial effects are also identified, where appropriate.

Alternative 2A

Direct Impacts

The primary direct impact associated with beach placement is burial of beach invertebrate animals (e.g., clams, sand crabs, worms) living within the substrate at the placement site. There is the potential to directly impact California grunion individually or their eggs by equipment damage or sand burial, if sand placement or site mobilization activities take place within 10 to 14 days of a spawning run. Other direct impacts may result from equipment damage associated with placement of pipelines to pump sediment to the beaches or offshore sites, operation of vehicles to move and spread sand at the placement sites, and movement of vehicles and equipment during access to and from the placement site. Many of the impacts can be generalized across the project sites and are not specifically discussed with respect to each site. None of the placement sites are expected to have long-term, significant impacts, as described further below.

Onshore

SAND PLACEMENT

Under sand placement for beach nourishment, large volumes of sand (105,000 to 300,000 cy depending on the placement site) would be placed above and through the intertidal zone that would result in burial impacts to small marine invertebrates (e.g., clams, sand crabs, worms). From the back beach to the top of the slope, where sand depths would be deeper, benthic

organisms would be smothered. Organisms also would be buried under decreasing depths of sand toward the toe of the slope. The loss of benthic organisms within the placement site footprint is an expected and unavoidable impact of beach replenishment projects. Most invertebrates within the placement site footprint are not expected to survive, but studies have shown that some mobile animals are able to escape or burrow out from the outer or leading edges of the beach fills where overburden depths are generally 2 feet or less (Lynch 1994, cited in NRC 1995). However, burrowing ability substantially decreases over short time frames (Mauer et al. 1986). Conservative assumptions were used in the impact analysis, with direct impact acreage being calculated as the entire footprint from the back beach to the toe of the slope.

Most studies have reported rapid recovery within 1 year or less for sandy beach intertidal animals after beach nourishment (NRC 1995; Greene 2002; SAIC 2007b). This begins almost immediately after cessation of construction. Recovery occurs via two mechanisms; one is by animals that migrate to the affected area from surrounding habitat, and the second is from recruitment from the plankton. Substantial recovery of invertebrate abundance, species number, and biomass occurred within 4 months after placement of 1 mcy of sand at Imperial Beach (Parr et al. 1998), within a larger area than the SELRP placement sites. Habitat functions were studied for 3 years after the 2001 RBSP at several beach sites in Encinitas, and were found to be enhanced through observations of increased invertebrate prey variety earlier in the season, greater sand depths and grunion habitat suitability, and increased bird use due to wider beach habitat across tide conditions (SAIC 2006). Habitat enhancement also was observed on an adjacent beach within 1,500 feet downcoast of the Cardiff placement site, although seasonal differences in habitat quality varied more at that site than the placement site.

Sandy beaches normally have higher invertebrate abundance in spring-summer due to recruitment and movement patterns of dominant species between the shallow subtidal and beach habitat. Consequently, the timing of projects may influence the speed of recovery times (reviewed in SAIC 2007b). Invertebrate recovery (e.g., species, abundance, biomass) periods in the order of weeks have been reported with projects completed in winter-early spring prior to the onset of the peak spring-early summer recruitment period. Recovery may take several months if construction is completed in summer-fall, not due to specific project impacts, but because it would be outside of the natural recruitment period. Regardless, recolonization would begin almost immediately and the development of invertebrate prey base would proceed naturally. While rapid recovery is expected for most invertebrates at sandy beaches, recovery rates may be slower for certain long-lived species, if present. For example, rapid recovery rates would not be expected to apply to slow-growing and long-lived species such as Pismo clams, particularly when considering recovery of age structure of populations. However, none of the placement sites support established Pismo clam beds.

California grunions spawn on sandy beaches in the San Diego region between March and August and have the potential to be affected by sand placement, construction activities, and vehicles that have the potential to damage eggs in the upper intertidal, if eggs are present. As part of the project, SELC would implement a pre-construction habitat assessment to determine potential suitability for grunion spawning and implement grunion monitoring during construction. If spawning is observed, the monitor would recommend protective measures, which may include relocation/rescheduling of work/equipment to avoid and minimize adverse effects to this species during their spawning season (PDF-67). Vehicle routes also may need to be specified to minimize impacts if vehicle access to the construction site occurs along the beach. It should be noted that additional or enhanced spawning habitat was provided at several beaches with the 2001 RBSP and 2012 RBSP, and the proposed project has the potential to again enhance or increase persistence of sandy beach habitat at erosive beaches. This would be beneficial for grunion at placement sites where either dense cobble or narrow beach width limits spawning habitat under existing conditions.

As described in the Marine Biological Technical Report (Appendix H), a total of 60.9 acres of beach habitat would be disturbed within the onshore areas of the placement sites due to sand placement under Alternative 2A (Table 3.6-16). While impacts would be adverse, the temporary habitat disturbance would not be significant on a regional scale because sandy beach habitat is the dominant shoreline habitat in San Diego County and disturbance of sandy beach habitat functions would be temporary. After construction, sandy beach organisms would begin recolonizing the site almost immediately with recovery anticipated in relatively short timeframes (within a year) depending on when each site is nourished within the overall construction schedule. Because construction would take about 6 months to complete, placement sites would be in various stages of recovery over the course of the construction period, thereby minimizing potential impacts to other wildlife from temporary reductions in invertebrate prey at individual placement site locations. Therefore, no long-term net loss in habitat value of sensitive biological habitat would occur. Direct impacts are summarized for each placement site below.

PIPELINE/EQUIPMENT PLACEMENT

Placement of pipelines would occur across the beach face or along the back of the beach. No sensitive habitats occur within the placement sites. Several sites have rocky intertidal or subtidal reef areas in the vicinity, which would be avoided during placement of pipelines. As noted in Table 2-26, a pre-construction survey would be conducted of pipeline routes to ensure no sensitive resources (e.g., hard-bottom habitat) are present within the pipeline alignment (PDF-55). If sensitive resources are present, the pipeline placement would be adjusted to avoid direct

**Table 3.6-16
Estimated Direct Impact Acreage from Sand Placement**

Placement Site	Dimensions		Quantity of Material (cy)
	Length	Width	
Onshore			
Leucadia	2,700	260	117,000
Moonlight	770	300	105,000
Cardiff (onshore)	3,400	360	300,000
Solana Beach	1,900	200	146,000
Torrey Pines	-	-	245,000
Total Onshore	8,770	1,120	913,000
Nearshore			
Cardiff (ebb bar)	1,250	1,250	500,000
Total Impacts	NA		1.4 mcy

Note: The quantities in this table total more than 1.4 mcY; not all sites may be utilized to the full capacity listed above.

impacts. Therefore, no sensitive resources would be directly impacted by the placement. **With this measure, no direct impacts to sensitive habitats or resources would be anticipated (Criterion A).**

Nearshore

SAND PLACEMENT

Approximately 500,000 cy of sand would be discharged nearshore inside the littoral cell at the Cardiff-nearshore site. As presented in Table 3.6-16, a total of 23.4 acres of nearshore habitat would be disturbed. While impacts would be adverse, the temporary habitat disturbance would not be significant on a regional scale because sandy nearshore habitat is the dominant shoreline habitat in San Diego County and disturbance of sandy nearshore habitat functions would be temporary. Similar direct impacts to invertebrates through burial would occur as described for onshore habitats. In addition, there is a potential for direct impacts to invertebrates and fish species through mortality due to burial by deposited sediment. Because fish are mobile, mortality rates are expected to be low. In addition, although sea turtles and marine mammals have the potential to use this area, because they are highly mobile (e.g., they can swim to clearer waters) it is unlikely they would be directly impacted due to sedimentation. In addition, to further limit potential impacts to marine mammals and turtles a Marine Mammal and Turtle Contingency Plan has been included as a project design feature (PDF-58). The Marine Mammal and Turtle Contingency Plan would be prepared prior to construction to minimize potential interactions between project vessels and protected marine species. A pre-construction contractor training

would be conducted by a qualified biologist to educate workers with respect to protected marine species and avoidance measures required by the contingency plan. Monitoring during construction would include marine mammal observers on project vessels who would notify the vessel operator if a protected marine species is in the vicinity.

After construction, invertebrate, fish species, sea turtles, and marine mammals are expected to recolonize or use this site almost immediately. **Therefore, direct impacts associated with sand placement within Cardiff-nearshore placement site is expected to be short term and less than significant. No substantial adverse impacts to habitat/species would occur (Criteria A, C, and D).**

PIPELINE/EQUIPMENT PLACEMENT

Sand placement at the Cardiff nearshore placement site would consist of pipe placement extending from the lagoon mouth 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 ebb bar constructed from the ocean floor up. Vegetated reefs present on the riprap associated with the San Elijo outfall structure would be avoided during placement of pipelines. A pre-construction survey would be completed for pipeline routes as discussed above to ensure no sensitive resources are directly impacted. **No direct impacts to nearshore resources due to pipeline or equipment placement would occur (Criterion A).**

Offshore

SAND PLACEMENT

Approximately 600,000 cy of sand would be discharged offshore within SO-5/SO-6 placement sites outside of the littoral cell. No sensitive habitat occurs within these placement sites. There is a potential for direct impacts to invertebrate and fish species due to burial by sediment placement, similar to onshore and nearshore placement sites. Sea turtles and marine mammals have the potential to use these stockpile sites, but because they are highly mobile it is unlikely they would be directly impacted due to sedimentation. Furthermore, a Marine Mammal and Turtle Contingency Plan has been included as a project design feature to further minimize potential impacts (PDF-58). Generally, potential risk for adverse effects is greater in restricted bodies of water such as narrow channels where mobile animals may not be able to avoid discharges or where passive organisms may become concentrated. Such conditions do not apply to open waters and would be expected to contribute to very low mortality rates at the stockpile sites. There would be a temporary reduction in benthic invertebrate biomass and alteration of the benthic community species composition at the stockpile sites associated with the sediment

placement. As described above, most studies have reported rapid recovery within 1 year or less for sandy beach intertidal animals after beach nourishment (NRC 1995; Greene 2002; SAIC 2007b). This begins almost immediately after cessation of construction. **Therefore, direct impacts associated with offshore sand placement are expected to be short-term and less than significant. No substantial adverse impacts to habitat/species would occur (Criteria A, C, and D).**

PIPELINE/EQUIPMENT PLACEMENT

Placement of sand at offshore sites would use a stable platform, such as a barge. Sand would be pumped from the lagoon through a discharge line to the barge, then through a barge-mounted downspout toward the seafloor. Material would exit the downspout near the seabed and settle out within the stockpile sites. The barge would be repositioned periodically to spread the discharge evenly. No sensitive habitats occur within the SO-5/SO-6 sites; however, they are within the vicinity of rocky and intertidal reef areas. These areas would be directly avoided during placement of pipelines. As noted in Table 2-26, a pre-construction survey would be completed for pipeline routes as discussed above to ensure no sensitive resources are directly impacted. **No direct impacts due to pipeline or equipment placement would occur (Criterion A).**

Indirect Impacts

Indirect impacts to biological resources may occur from turbidity generated during construction, construction noise and activity disturbance, and transport of sand away from the site via natural coastal processes up and down the coast. None of the placement or stockpile sites are predicted to experience long-term, significant impacts.

The following types of indirect impacts may result from sand placement:

- Forage reduction or alteration
- Disturbance, displacement, or interference
- Turbidity
- Sedimentation

In addition, benefits also would occur to sandy habitats after project implementation. Monitoring after the 2001 RBSP demonstrated that beach nourishment enhanced sandy beach habitat functions at several beaches. This was most noticeable at beaches that transitioned from either cobble-covered beaches supporting few biological resources or beaches with highly seasonal periods of productivity coincident with seasonal sand accretion and erosion. The primary benefit was to increase the persistence of sandy beach habitat across seasons such that habitat was

suitable early in the season to support the onset of the grunion spawning season and invertebrate recruitment period. This enhancement resulted in increased invertebrate diversity earlier in the season, increased bird use across tide conditions, and enhanced habitat for grunion spawning (e.g., increased beach width and reduction in cobble) (SAIC 2006). Similar beneficial impacts would be anticipated after implementation of the SELRP.

Indirect impacts are assessed below in terms of sediment placement at onshore, nearshore, and offshore placement sites. Each type of indirect impact is assessed for habitats, general wildlife, and potential indirect impacts to federally listed or state-listed endangered or threatened species. Many of the impacts caused by onshore placement sites can be generalized across project placement sites and are not specifically discussed with respect to each site. Indirect impacts to nearshore resources due to project sedimentation could have localized effects, however, and are discussed below according to placement site.

Onshore

THREATENED AND ENDANGERED SPECIES

CALIFORNIA LEAST TERN

All placement sites are located at least 0.8 mile away from nesting site locations that may be seasonally used by endangered least terns during their April–September breeding season. The noise levels would not be a disruption to the birds at such a distance. Therefore, indirect impacts due to construction noise would not occur. However, placement of sand at the onshore placement sites would generate turbidity that would be expected to be localized and rapidly dissipate based on the sandy composition of the sediment.

The following sites are located more than 1 mile from least tern nesting sites and would not be expected to affect foraging of the species based on the localized nature of turbidity plumes expected during construction: Moonlight Beach, Cardiff, Solana Beach, and Torrey Pines (Figures 3-4 and 3-5 included in Appendix H).

The Leucadia placement site is 0.8 mile from the closest nest site and distance increases as one moves along the placement site. Use of training dikes to promote sand deposition and reduction of suspended sediments in return water would reduce turbidity plumes during beach construction (PDF-51). This design feature was found to be effective at reducing turbidity plumes during the 2001 RBSP and ensuring that the project met the USFWS specified environmental conditions of the Biological Opinion Sand placement operations for Alternative 2A, conducted in compliance with permit conditions, would not result in significant impacts to foraging. **With construction of**

training dikes to reduce suspended sediments, the project would not result in significant impacts to California least tern and impacts would not be substantially adverse (Criterion C).

WESTERN SNOWY PLOVER

The Torrey Pines placement site is located close to critical habitat for western snowy plover. The nearest nests are located at Los Peñasquitos Lagoon and San Dieguito Lagoon. Design features would be used to protect foraging snowy plover, including but not limited to shielding and directing construction lights at the Torrey Pines placement site toward the ocean and away from back beaches (PDF-7), as well as biological monitoring by a qualified biologist to avoid impacts to foraging snowy plover, should they be present during sand placement (PDF-74). Sand placement at the Torrey Pines site would occur outside the breeding season (April 1 through September 15 or after August 1 with confirmation of cessation of nesting) and to ensure no sand is placed within designated or proposed critical habitat to minimize potential impacts to western snowy plover. **With implementation of the described features, the project would not result in significant impacts to western snowy plover and no substantial adverse impacts would occur (Criterion C).**

FORAGE REDUCTION, ALTERATION, OR MODIFICATION

There is potential for indirect effects to shorebird foraging from burial of invertebrates within the footprint of the placement sites. **This impact would not be substantially adverse and would remain less than significant (Criterion D)** since each placement site has unaffected shoreline nearby and recolonization of the placement site by invertebrates would be rapid (e.g., weeks to months).

Temporary attraction of birds, particularly gulls, to the discharge location is anticipated based on observations from a variety of beach nourishment projects. The birds are attracted to the sand-slurry pumped onto the beach or its return water, where they opportunistically forage on dead invertebrates and organic debris originating from the dredged site. Similarly, fish that feed on plankton or small organic particles may be attracted to turbidity plumes associated with sediment dispersal, 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. **Such effects are temporary, not substantially adverse, and less than significant (Criterion D).**

No adverse effects on seabird or waterbird foraging were observed with implementation of the 2001 RBSP (AMEC 2002). Bird surveys were not specifically conducted for the 2012 RBSP

within the areas of the placement sites. However, biological monitors present noted no obvious effects of discharge turbidity on bird foraging behavior or locations. Because turbidity plumes are expected to be similar to the 2001 and 2012 RBSPs, **project-related effects on seabird and waterbird foraging are expected to not be substantially adverse and to remain less than significant (Criterion D).**

DISTURBANCE, DISPLACEMENT, OR INTERFERENCE

Equipment operation noise and activities have the potential to disturb shorebirds, gulls, and other coastal birds that may forage or rest on beaches at or near placement sites. **This impact would not be significant because disturbance effects would be temporary and limited to the period of construction, unaffected shoreline occurs adjacent to each placement site that provides foraging opportunities, and the forage base at the placement site would rapidly recover. No substantial adverse impacts would occur (Criterion D).**

Artificial night lighting has the potential to disturb or attract wildlife. Grunion have been documented to spawn in the vicinity of beach disposal operations, including the 2001 RBSP. Some reports suggest that grunion spawning may be less 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. **Lighting impacts to grunion would be less than significant because habitat suitability assessments, monitoring during construction, and avoidance/minimization of spawning grunion would be used to minimize impacts to the species. No substantial adverse impacts would occur (Criterion D).**

TURBIDITY

Turbidity has the potential to indirectly impact plankton, fish, marine mammals, kelp, and vegetated reefs. Turbidity within the ocean environment is naturally variable depending on wave climate and season. Monitoring data from seven California beach nourishment projects indicate that turbidity measurements with a nephelometer (nephelometric turbidity units [NTUs]) were below or within ranges measured during storm or high wave conditions (SAIC 2007b). 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 sediments are sandy with relatively large average grain size, project-related turbidity would quickly settle and plumes would be temporary.

Most placement sites would be constructed within 10 to 15 days. Therefore, exposure durations to elevated turbidity at any particular reef or other nearshore location generally would be on the

order of days to a week. Exposure durations would be substantially less (e.g., minutes, hours) for mobile organisms.

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 within return waters (PDF-51). This design feature was implemented during the 2001 and 2012 RBSPs and found to be effective for minimizing turbidity plumes at the placement sites. With this feature, suspended sediment concentrations would be reduced, thereby minimizing potential effects associated with the range of exposure durations that may occur depending on equipment type and differences in placement site configurations.

The effects of suspended particulates on plankton are generally considered negligible because of the limited area affected and short exposure time as they drift through the affected areas. Similarly, effects 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 placement sites, and 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. No significant impacts are anticipated to plankton, fish, or marine mammals as a result of turbidity.

Kelp beds occur from approximately 850 to 5,000 feet offshore of the placement sites, which is outside the distance that turbidity plumes would be expected to travel offshore unless carried by rip currents. Kelp beds are known to be adversely affected by turbidity when large amounts of shifting sediment bury small plants and prevent settling of microscopic spores, thereby reducing kelp beds. In the unlikely event that turbidity did extend offshore, the particulate concentration would be expected to be low and therefore is not expected to bury small plants and/or prevent settling of microscopic spores resulting in only negligible effects on the kelp bed. **Therefore, no significant impacts are anticipated to kelp beds as a result of turbidity, and no substantial adverse impacts would occur (Criteria A and D).**

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 effects 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 effects 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 (PDF-51). **Therefore, turbidity impacts would not be substantially adverse and would be expected to be less than significant on reef habitat and within the distance of the expected turbidity plumes (Criteria A and D).**

SEDIMENTATION

Fill material placed on individual placement 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. As defined in Section 3.6.3, sensitive indicator species consist of surfgrass, feather boa kelp, sea fans, sea palms, and giant kelp.

Evaluating potential indirect sedimentation impacts is complex and the impact conclusions must be determined in light of the dynamic ocean system, where seasonal changes in sand elevation naturally occurs, and understanding of the life history of sensitive species and their relative distribution on nearshore reefs. Similar to the 2001 and 2012 RBSPs, coastal numerical and analytical modeling was used to predict the influence of the project on sand elevation in the vicinity of the placement sites over time. The method is described in Appendix H.

Site conditions vary by placement site, and sedimentation would have different effects on each site depending on these conditions. The closest distances to sensitive habitats from placement sites are summarized in Table 3.6-17. The effect of predicted additional sand influence on resources located in proximity to each placement site is discussed in detail below.

Table 3.6-17
Estimated Closest Distances to Hard-Bottom and Vegetated Habitats from the Seaward Boundary of Proposed Placement Site Alternatives (from SANDAG 2011)

Proposed Placement Sites	Distance (feet) From Placement Site to Hard-Bottom or Vegetated Habitats				
	Hard Bottom (2002)	Intertidal Surfgrass (2002)	Subtidal Surfgrass (2002)	Understory Algae (2002)	Kelp Bed (2008)
Leucadia	150	150	150	290	1000
Moonlight Beach	330	3000	500	400	850
Cardiff (beach)	700	1800	1000	1500	1500
Solana Beach	120	1500	240	200	2500
Torrey Pines	150	200	200	1000	>5000

Note: Historical kelp bed represents maximum extent of kelp across multiple years, 1967–2002; Distances are estimates based on placement site footprints, 2002 Habitat Inventory maps, and 2008 kelp cover.

LEUCADIA

The Alternative 2A volume of sand and location of the Leucadia placement site are the same as with the 2001 and 2012 RBSPs. Modeling predictions of persistent sand increase for the SELRP are similar to those of the 2012 RBSP. Modeling predicts average increases in sand elevation of 0.5 to 0.6 foot at distances of 400 to 850 feet offshore. No seasonal scour of reef tops with sensitive resources is predicted because reef heights with sensitive indicators predominantly range between 1 and 3 feet. There may be some reduction of low-relief hard-bottom (less than or equal to 0.5 foot) that is seasonally scoured and does not support sensitive habitat indicators; however, this would be expected to be relatively minor given that predominant reef heights in this area exceed 1 foot.

It is anticipated that the impacts of the SELRP on the hard-bottom habitat offshore of Leucadia would be less than significant for the following reasons: (1) reef heights extend above the predicted level of seasonal sand elevation increase offshore and downcoast of the placement site, (2) reef conditions in 2009 offshore and downcoast of the placement site appear similar to conditions observed in 2000 indicating that similar sand placement projects (i.e., 2001 RBSP) implemented previously have not resulted in changes, and (3) monitoring after the 2001 RBSP did not detect a substantial change in sedimentation or surfgrass offshore or within 2,700 feet downcoast of the site attributable to the project.

MOONLIGHT BEACH

The Alternative 2A volume of sand and location of the Moonlight Beach placement site are the same as with the 2001 and 2012 RBSPs. Conditions both before and after the 2001 RBSP showed that inshore portions of reefs in the vicinity are sand influenced with limited resource development within 800 to 1,000 feet offshore. Limited impact to reefs is estimated because predicted seasonal sand level increases are 0.6 foot or less within 800 feet offshore of the site and decrease with increasing distance offshore, and upcoast and downcoast of the site.

Predicted sand level increases are 4 inches or less at downcoast areas (2,500 feet or more) where surfgrass may be exposed during minus tides. That level of increase would have little, if any, effect because surfgrass predominantly occurs on rocks that seasonally extend above the sand surface under existing conditions.

The inshore portion of the reef adjacent to the northern site boundary is sand influenced within 400 to 800 feet offshore under existing conditions. This is likely due to the relatively low reef heights (predominantly 1 foot or less in June 2006) being within the range of historic seasonal sand level changes, which range from 1 to 2 feet extending from the intertidal to within 800 feet

offshore. Therefore, sand level increases of 0.6 foot or less would not substantially bury hard-bottom but may contribute to seasonal sand scour of low-lying reef with limited resource development (e.g., turf algae). Those levels would be expected to have a limited effect since reef heights with sensitive indicators predominantly range between 1 and 2 feet.

It is anticipated that the impacts associated with the SELRP on the hard-bottom habitat in the vicinity of the Moonlight Beach placement site would be less than significant for the following reasons: (1) reef heights in the vicinity extend above the predicted level of seasonal sand elevation increase, (2) current reef conditions in the vicinity of the placement site appear similar to conditions observed in 2000 before the 2001, and (3) monitoring after the 2001 RBSP in the vicinity did not detect a substantial change in sedimentation or surfgrass attributable to the project.

CARDIFF

The Alternative 2A volume of sand is greater and the footprint of the proposed Cardiff placement site is extended from that utilized for the 2001 RBSP or 2012 RBSP; specifically 300,000 cy instead of just over 100,000 cy. The transition point of greatest sand level change is coincident with a reef located approximately 1,000 feet offshore, suggesting that the reef modifies movement of sand at that location. Modeling predicts average sand level increases up to 1 foot; these increases are within the range of variability of seasonal sand level change and are below the predominant reef heights that support sensitive indicator species on Cardiff, Seaside, and Table Tops reefs.

Intertidal rock is already sand influenced with turf algae or a combination of turf algae and surfgrass under existing conditions, which is consistent with historical sand level changes of 1 to 2 feet in the intertidal. Surfgrass occurs on rock heights of 0 to 2 feet and may be partially buried in sand under existing conditions. Recent surveys indicate that surfgrass shoots have lengths of more than 2 feet in the low intertidal zone on these reefs; therefore, the small predicted levels of sand increase would not be expected to substantially increase the depth of seasonal sedimentation or partial burial of surfgrass.

It is anticipated that the impacts of the SELRP on the hard-bottom habitat in the vicinity of the Cardiff placement site would be less than significant for the following reasons: (1) predicted sand level increases are low and within the range of natural seasonal variability, (2) predominant reef heights with sensitive indicators extend above the predicted level of seasonal sand elevation increase, (3) existing reef conditions in the vicinity of the placement site are similar to conditions observed in 2000 before the 2001 RBSP, and (4) monitoring after the 2001 RBSP reported no substantial change in surfgrass attributed to the project.

SOLANA BEACH

The Alternative 2A volume of sand and location of the Solana Beach placement site are the same as with the 2012 RBSP. Modeling predictions of persistent sand increase for the SELRP are within the range predicted for the 2001 RBSP. Modeling predicts seasonal sand level increases of 0.6 to 0.8 foot within 600 feet offshore and generally 0.5 foot or less with increasing distance offshore, and upcoast and downcoast. These levels would be below the reef heights supporting sensitive indicator species. Substantial reef occurs in proximity to the placement site, including Table Tops reef, which extends onto the shore and is a popular tidepool location in northern San Diego County. More scattered rock reef occurs offshore farther south, and a concentrated patch is locally known as Pill Box reef. A substantial reef feature occurs north of San Dieguito Lagoon. Offshore reef heights are variable, ranging from less than 1 to greater than 6 feet, with heights of 1 to 2 feet common, with most ranging higher. Surfgrass dominates inshore portions of reef, and surfgrass and understory algae are common on reef within 1,300 feet offshore. Reef edges and low relief (less than 1 foot) are dominated by turf algae, indicating sand influence. No impacts to offshore kelp beds are suggested by the model results, which predict sand level increases of 0.1 foot or less at distances offshore where kelp beds occur.

Monitoring of the 2001 RBSP detected sedimentation at certain stations off of Solana Beach. No change in surfgrass cover was observed, although localized changes in surfgrass density were reported. Increased sedimentation was noted at some kelp monitoring stations. Kelp cover was low on a regional scale during the monitoring period due to prior El Niño influence. Kelp bed development is greater under existing conditions than prior to or during the 2001 RBSP due to regional recovery following El Niño events. Therefore, effects of the 2001 RBSP appeared localized and not significant.

It is anticipated that the impacts of the SELRP on the hard-bottom habitat offshore of Solana Beach would be less than significant because reef heights extend above the predicted level of seasonal sand elevation increase in the vicinity of the placement site. Further, monitoring from the 2001 RBSP identified localized but not significant effects. The proposed placement site volume and location are identical under this alternative.

TORREY PINES

The Alternative 2A volume of sand and location of the Torrey Pines placement site are the same as with the 2001 RBSP. A localized reef outcrop with surfgrass occurs offshore of the placement site. More developed reefs with understory algae and surfgrass are located approximately 1,100 feet downcoast and 1,400 feet upcoast of the site. Kelp bed habitat is nearly 1 mile from the site. Nearshore reef heights of less than 1 foot mainly have turf algae, while higher relief reef,

generally ranging from 1 to 3 feet, supports surfgrass and understory algae. Modeling predicts persistent sand level increases on the order of 0.5 to 0.7 foot and seasonal increases of up to 0.8 to 1 foot that would decrease over time and distance from the placement site. Partial sedimentation of reefs may occur but would not be expected to substantially bury reefs with sensitive indicator species.

No monitoring stations were established in the vicinity of the 2001 RBSP receiver site at Torrey Pines. However, intertidal surfgrass was observed in 2000 during minus tide surveys before the 2001 RBSP and was documented in the same locations during the January 2010 intertidal surfgrass survey. Nearshore surveys conducted downcoast of the receiver site in 2009 documented surfgrass in addition to the understory algae that was mapped with the 2002 Nearshore Program Habitat Inventory. Generally, surfgrass occurrence was sparse on reef transects surveyed in 2009.

It is anticipated that the impacts of the SELRP on the hard-bottom habitat in the vicinity of the Torrey Pines placement site would be less than significant because (1) reef heights extend above the predicted level of seasonal sand elevation increase upcoast and downcoast of the placement site and (2) reef conditions in 2009 did not indicate substantial sand influenced habitat degradation from the 2001 RBSP.

SUMMARY OF INDIRECT SEDIMENTATION IMPACTS

Beach sand placed on placement 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. Generally, sedimentation at profiles was less than 1 foot, with the primary exception being in the vicinity of San Elijo. In addition, even when sediment levels exceeded 1 foot, it rarely persisted for more than 1 year.

Results indicated that project-related impacts were several orders of magnitude less than natural variation, suggesting that no impact to sensitive nearshore marine resources are predicted from implementation of Alternative 2A. Therefore, it is concluded that **indirect impacts due to sedimentation would be short term and less than significant. No substantial adverse impacts would occur (Criterion A).**

OTHER CONSTRUCTION ISSUES

Operation of equipment on the beach has the potential to introduce contaminants to the marine environment from minor spills and leaks. The probability of this type of accidental discharge is

considered low. The contractor is required to prepare a Spill Prevention, Control and Countermeasure plan for hazardous spill containment, that would include good housekeeping practices, secondary containment, etc. (PDF-3). If a spill occurred, the contractor would utilize BMPs specified for spill cleanup outlined in the Spill Prevention, Control and Countermeasure plan to prevent long-term degradation of water quality. **For these reasons, impacts to biological resources from accidental discharges would be expected to be less than significant. No substantial adverse impacts would occur (Criterion A).**

Nearshore

FORAGE REDUCTION, ALTERATION, OR MODIFICATION

There is potential for indirect effects to marine biota (fish, sea turtles, and marine mammals) and seabird and waterbird foraging due to the turbidity caused by sedimentation. **These effects would be temporary and would be less than significant because turbidity plumes are expected to be localized and short term. No substantial impacts would occur (Criterion D).**

DISTURBANCE, DISPLACEMENT, OR INTERFERENCE

Equipment operation noise and activities have the potential to disturb coastal birds and marine biota (fish, sea turtles, marine mammals) that may forage within this area. **This impact would not be substantially adverse or significant because disturbance effects would be temporary and limited to the period of construction, unaffected areas occurring adjacent to Cardiff-nearshore placement site would still provide foraging opportunities, and the forage base within this site would rapidly recover (Criterion D).**

TURBIDITY

Indirect impacts due to turbidity from the placement of sediment at Cardiff-nearshore would have similar effects to marine invertebrates, plankton, fish species, marine mammals, and vegetated reefs as discussed for onshore placement sites. As noted, turbidity plumes associated with this placement site would be relatively small, localized, and of short duration. **Turbidity impacts would be expected to be less than significant and not substantially adverse on reef habitat and within the distance of the expected turbidity plumes (Criteria A and D).**

SEDIMENTATION

Analytical modeling of the ebb bar indicated there may be an area that measures approximately 2,200 feet alongshore and 1,600 feet cross-shore off Cardiff State Beach that would be affected

by increased sedimentation due to sand placement at Cardiff-nearshore. The estimated depth of the sediment within that area would be approximately 3 feet if it were a three-dimension rectangle with no variation. However, it would be more likely that sediment thickness would vary with a maximum thickness in the center and minimum thickness along the edges. For example, the center may be 6 feet thick while the edges may be 0 feet thick. Biological resources that could be affected by the increased sedimentation are those understory and giant kelp plants present on the riprap associated with the San Elijo Outfall. Based on historical kelp canopy cover, up to 6 acres of understory and/or giant kelp plants could be affected. However, impacts to these resources are not included in this analysis since the intent of the riprap is to support and protect the outfall pipe, and it was not created as an artificial reef to enhance biological productivity. In addition, the San Elijo Joint Powers Authority is under permit to maintain and remove kelp plants at this location to ensure the integrity of the riprap is not compromised. **No substantial adverse impacts would occur, and impacts would remain less than significant (Criterion A).**

OTHER CONSTRUCTION ISSUES

The placement of temporary pipelines, anchoring, installation of monobuoys, and vessel transport have the potential to impact sensitive resources. Project permit conditions would include requirements to avoid sensitive resources such as kelp, reefs, and structures such as outfalls. Discharge lines would be placed to prevent vessels from traversing kelp beds and vessel transit corridors also would avoid kelp beds. In addition, an anchor plan would be prepared for each monobuoy to avoid sensitive resources in the area. **Avoidance of sensitive resources during placement of temporary pipelines, vessel transport, and anchoring would result in less than significant impacts, and no substantial adverse impacts would occur (Criterion A).**

Operation of equipment 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. If a spill occurred, the contractor would utilize BMPs to prevent long-term degradation of water quality. For these reasons, **impacts to biological resources from accidental discharges would be expected to be less than significant (Criterion A). No substantial adverse impacts would occur.**

Offshore

FORAGE REDUCTION, ALTERATION, OR MODIFICATION

There is the potential for indirect effects to marine biota foraging due to the turbidity caused by placement of sediment at SO-5/SO-6. However, turbidity plumes are expected to be localized and directly surrounded by other forage opportunities within the ocean. **These effects are temporary and would be less than significant because turbidity plumes are expected to be localized and short term. No substantial adverse impacts would occur (Criterion D).**

DISTURBANCE, DISPLACEMENT, OR INTERFERENCE

Equipment operation noise and activities have the potential to disturb coastal birds and marine biota (fish, sea turtles, and marine mammals) that may forage within this area. **This impact would not be significant because disturbance effects would be temporary and limited to the period of construction, unaffected areas occurring adjacent to Cardiff-nearshore placement site would still provide foraging opportunities, and the forage base within this site would rapidly recover. No substantial adverse impacts would occur (Criterion D).**

TURBIDITY

Placement of sediment at SO-5/SO-6 would result in turbidity and disturbance effects with the potential to affect organisms or habitats. However, this would cause temporary and localized turbidity plumes during construction. No long-term reductions in water clarity or quality would be expected. Turbidity can have a number of adverse effects on marine biota. Reduction of water clarity or ambient light levels can impact primary production of plankton, inhibit plant growth or recruitment of plants in vegetated habitats, reduce foraging efficiency of a variety of animals, or cause physiological stress in organisms unable to move from the effects.

The effects of suspended particulates on plankton are generally considered negligible because of the limited area affected and short exposure time as they drift through the affected areas. Similarly, effects 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 placement sites, and 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. **No substantial adverse or significant impacts are anticipated to plankton, fish, or marine mammals as a result of turbidity (Criteria A and D).**

Kelp beds occur from about 500 feet from the stockpile sites; however, this is outside the distance that turbidity plumes would be expected to travel. In the unlikely event that turbidity did extend to these areas, particulate concentration would be expected to be so low as to have a negligible effect on the kelp bed. Therefore, **no substantial adverse or significant indirect impacts to kelp beds are anticipated from turbidity generated from stockpile site construction (Criterion A).**

Settlement of suspended sediment from turbidity plumes is not anticipated to indirectly impact vegetated reefs or offshore kelp beds due to the distance (500 feet or greater) of these sensitive habitats from the stockpile sites. **No significant or substantially adverse impacts would occur (Criterion A).**

OTHER CONSTRUCTION ISSUES

The placement of temporary pipelines, anchoring, installation of monobuoys, and vessel transport would have similar impacts to offshore habitats as discussed for the Cardiff-nearshore site. **Impacts to biological resources from accidental discharges would be expected to be less than significant (Criterion A). No substantial adverse impacts would occur.**

Essential Fish Habitat

Designated EFH occurs along the nearshore areas adjacent to placement sites and SO-5/SO-6. In addition to EFH designations, certain areas may also be designated as HAPCs (e.g., estuaries, canopy kelp, sea grass, rocky reefs). HAPCs are discrete subsets of EFH that provide important ecological functions or are vulnerable to degradation (Appendix H). As determined by the analysis in the preceding sections, no substantial adverse effects to quality or quantity of EFH are suggested by modeling predictions of sand level changes within 5 years of project implementation. Less than significant impacts to EFH such as water column habitat, benthic habitat at both the placement and stockpile sites, and HAPCs (e.g., estuaries, canopy kelp, sea grass, rocky reefs), are anticipated and would constitute temporary adverse impacts (e.g., temporary turbidity plume due to loss of prey items at placement sites due to nourishment). Similarly, temporary adverse impacts to life stages of managed species are expected to occur as a result of the project. Protective measures have been implemented to avoid and/or minimize these impacts. **Therefore, impacts to EFH would be less than significant (Criterion A). No substantial adverse impacts would occur.**

Alternative 1B**Direct Impacts**

The area of direct impact to beach habitat and invertebrate resources would be slightly smaller than identified under Alternative 2A due to the smaller amount of material proposed to be deposited onto the Cardiff nearshore placement site. As noted for Alternative 2A, actual impacts to biological resources would be less at some sites as marine invertebrates do not inhabit back beach nontidal areas and some would escape mortality along the constructed slope and leading edge of the fill. A maximum of 78 acres of beach habitat would be disturbed by construction of Alternative 1B (Table 3.6-18). Temporary habitat disturbance would not be significant on a regional basis because sandy beach habitat is the dominant shoreline habitat in San Diego County. Furthermore, construction would be sequential and would affect a single placement site at any one time; therefore, placement sites would be in various stages of recovery over the course of the construction period. Effects of construction on fish and wildlife largely would be localized rather than regional in scope.

**Table 3.6-18
Estimated Direct Impact from Sand Placement**

Placement Site	Dimensions (feet)		Quantity of Material (cy)
	Length	Width	
Onshore			
Leucadia	2,700	260	117,000
Moonlight	770	300	105,000
Cardiff (onshore)	3,000	360	300,000
Solana Beach	1,900	200	146,000
Torrey Pines	-	-	245,000
Total Onshore	8,370	1,120	913,000
Nearshore			
Cardiff (ebb bar)	1,000	1,000	300,000
Total Impacts	9,370	2,120	1.2 mcy

Leucadia, Moonlight Beach, Torrey Pines, SO-5/SO-6, Cardiff-onshore, Solana Beach

These placement sites have the same footprint as Alternative 2A and direct effects would be similar to those described for Alternative 2A. Therefore, the nature of the impact would be similar to Alternative 2A and **would not constitute a significant impact (Criterion A). No substantial adverse impacts would occur.**

Cardiff-nearshore

The footprint at this placement site would be smaller (approximately 200,000 cy less) than proposed under Alternative 2A; therefore, the nature of the impact would be similar to or less than analyzed in Alternative 2A and **would not constitute a significant impact. Similarly, impacts to grunion would be minimized and would remain less than significant (Criteria A and D). No substantial adverse impacts would occur.**

Indirect Impacts

Indirect impacts associated with Alternative 1B are anticipated to be similar to Alternative 2A, because sand placement occurs within the same footprints as analyzed in Alternative 2A, with the exception of the Cardiff-nearshore site. Under Alternative 1B, less sediment would be discharged within the Cardiff-nearshore site resulting in indirect impacts similar to or less than those analyzed for Alternative 2A. **No substantial adverse impacts would occur, and impacts would be less than significant (Criteria A and D).**

Alternative 1A

Alternative 1A proposes to dispose approximately 160,000 cy of material to the LA-5 offshore disposal site. This site is an approved ocean disposal site designated by EPA in 1987. The direct and indirect biological impacts associated with the disposal of materials at this site were fully evaluated in the 1987 EIS for LA-5. Use of LA-5 would require compliance with the environmental approvals already completed for that site (e.g., through Tier 3 testing and approval from the Corps and EPA). **Therefore, Alternative 1A is not expected to cause additional impacts than those analyzed in the 1987 EIS (Criteria A through E).**

No Project Alternative

Under the No Project Alternative, no sand would be placed on the beaches, in the nearshore or at LA-5. No impacts would occur and the beaches would not receive the benefit of sand placement. **No significant impacts would result with the No Project Alternative and no substantial adverse impacts would occur (Criteria A through E).**

Impact Conclusion

The SELRP is, by design, a project for the long-term improvement of water quality and health/diversity of biological resources. Numerous project design features are incorporated into the project to minimize impacts during construction and most potential impacts to biological

resources would be less than significant. However, during construction, there would be significant impacts to sensitive vegetation communities and resident marsh birds where temporary loss of habitat would exceed 50 percent. In addition, short-term significant and substantially adverse impacts to birds may result from indirect noise impacts. There would be no long-term significant or substantial adverse impacts; ultimately, the noise levels would reduce to existing levels where these sensitive species are residents, and habitat diversity would facilitate stable populations of these species.

There would be no substantial adverse or significant impacts to marine biological resources.

A summary of lagoon impacts is provided in Table 3.6-19, by alternative. Impacts associated with materials disposal are considered less than significant.

3.6.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Lagoon Restoration

A variety of project design features detailed in Chapter 2 would be implemented during construction to avoid and reduce impacts to biological resources, including phasing and refugia (PDF-12), clearing and grubbing outside of the breeding season (PDF-12), biological monitoring to avoid and minimize impacts to resident birds (PDF-13) flooding schedule limitations to prevent impacts to light-footed Ridgway's rail (PDF-17 and PDF-19), and a habitat enhancement plan for light-footed Ridgway's rail and Belding's savannah sparrow (PDF-21). These features would be required of the project via

construction specifications and other agreements. Because this project is a restoration 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. Significant short-term impacts to vegetation communities were identified with Alternative 2A and Alternative 1B, due to the loss of over 50 percent of a sensitive habitat community for over 12 months.

A project design feature was considered to reduce short-term impacts to sensitive habitats. This project design feature was rejected, as described below:

Phasing – Consideration was given to phasing the project over a longer period of time to avoid impacting more than 50 percent of a given habitat type within a basin. However, several challenges were presented with this phasing concept, including (1) the inability to conduct wet

Table 3.6-19
Summary of Impacts to Biological Resources by Alternative

CEQA Threshold of Significance Category		Alternative		
		Alternative 2A	Alternative 1B	Alternative 1A
Sensitive Riparian and Natural Vegetation Communities	Short Term	Significant Direct Impact (low- and mid-salt marsh, open water, salt panne, and tidal mudflats)	Significant Direct Impact (low- and mid-salt marsh, open water, salt panne, and tidal mudflats)	Less than significant (all habitats)
	Long Term	Less than significant	Less than significant	Less than significant
		Less than significant	Less than significant	Not significant
		Less than significant direct impact	Less than significant direct impact	Less than significant direct impact
Jurisdictional Waters and Wetlands	Short Term	Less than significant	Less than significant	Less than significant
		Less than significant	Less than significant	Not significant
		Less than significant direct impact	Less than significant direct impact	Less than significant direct impact
	Long Term	Less than significant	Less than significant	Less than significant
Sensitive Species	Short Term	Significant direct impact (Belding's savannah sparrow)	Significant direct impact (Belding's savannah sparrow)	Less than significant direct impact (Belding's savannah sparrow, light-footed Ridgway's rail, least tern, and snowy plover)
		Less than significant direct impact (light-footed Ridgway's rail)	Less than significant direct impact (light-footed Ridgway's rail)	Significant indirect impact (construction noise)
		Significant indirect impact (construction noise)	Significant indirect impact (construction noise)	Less than significant
	Long Term	Less than significant	Less than significant	Less than significant
Local Ordinances, Policies, Adopted Plans	Short Term	Less than significant direct impact (Belding's savannah sparrow and light-footed Ridgway's rail)	Less than significant direct impact (Belding's savannah sparrow and light-footed Ridgway's rail)	No direct impact
		Less than significant indirect impact (transitional habitat)	Less than significant indirect impact (transitional habitat)	Less than significant indirect impact (transitional habitat)
		Less than significant	Less than significant	No impact
	Long Term	No impact	No impact	No impact

construction; (2) substantial earthwork to create “cells” to limit impacts to areas within a given basin; (3) significant increases in the overall length of the project, which could result in greater impacts to habitats and species; and (4) construction costs that could increase substantially. For these reasons, phasing was determined to be more impactful and not preferred.

Short-term impacts to Belding’s savannah sparrow remain significant and unavoidable with implementation of Alternative 2A and Alternative 1B.

Mitigation measures were considered to further reduce noise impacts, but were rejected as described below.

Electric dredge – The project currently proposes the use of a diesel dredge and/or an electric dredge. The potential benefit of requiring electric dredge use to reduce noise levels adjacent to habitats for sensitive bird species was evaluated. However, as described in Section 3.12, noise measurements from an electric dredge (estimated 71 dBA) and a diesel dredge (73 dBA) do not substantially differ. Therefore, the sole use of an electric dredge was not considered an effective mitigation measure for noise impacts to sensitive species (see Section 3.12 Noise).

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 are typically 6 feet high and constructed of plywood with strong footings to support the wall over the life of construction. This physical buffer can lower noise levels to below a level of significance. Because the dredge would be moving its way through the lagoon throughout construction, and the habitat of concern is directly adjacent marsh habitat, an intervening noise wall would have to be constructed in mucky 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 touched, and could prevent/hinder marsh species from readily accessing the lagoon itself. The dredge would be mobile but the wall would not. The impacts associated with construction of the noise walls, and the introduced barrier, would reduce or eliminate the value of this mitigation measure. Noise walls are considered an infeasible mitigation measure.

Alternative work schedule (outside nesting season) – An alternative work schedule was considered requiring work to be conducted outside of the bird nesting season. This would avoid increased noise during the most sensitive time period for these marsh species as construction would completely halt February 15 through September 1. The stop and start

schedule would extend the overall construction duration from 3 years to 6. The longer duration of construction would result in 4 contiguous years of disruption to foraging birds (including two sensitive resident birds—Belding’s savannah sparrow and light-footed Ridgway’s rail, and two sensitive winter migrants—least tern and western snowy plover). This option was discussed with resource agency staff and lagoon managers in the SELRP stakeholders group. They concurred that the longer duration would result in greater impacts than temporary construction noise during the breeding season, in part because the dredge is mobile. Furthermore, this measure would lengthen the amount of time the overall lagoon would need for habitat recovery by at least 2 years. A mitigation measure requiring work outside of the nesting season was determined to be biologically undesirable and therefore infeasible.

Materials Disposal

A variety of project design features detailed in Chapter 2 would be implemented during materials disposal to avoid and reduce impacts to biological resources, including use of training dikes to reduce turbidity (PDF-51), water quality monitoring (PDF-53), avoidance of sensitive hard-bottom habitats (PDF-55 and PDF-56), grunion monitoring (PDF-57), and a Marine Mammal Turtle Contingency Plan (PDF-58). No significant impacts would occur, so no mitigation measures are proposed for impacts to biological resources associated with materials disposal.

3.6.5 LEVEL OF IMPACT AFTER MITIGATION

Lagoon Restoration

CEQA Conclusion: Short-term substantial adverse impacts to sensitive vegetation and Belding’s savannah sparrow would be unavoidable with implementation of Alternative 2A and Alternative 1B. Noise impacts to nesting birds would be unavoidable with implementation of Alternative 2A, Alternative 1B, and Alternative 1A. As described above, even with the numerous project design features to reduce these impacts, they remain significant. No long-term significant impacts were identified for any of the project alternatives.

NEPA Conclusion: Short-term substantial adverse impacts to sensitive vegetation and Belding’s savannah sparrow would be unavoidable with implementation of Alternative 2A and Alternative 1B. Noise impacts to nesting birds would be unavoidable with implementation of Alternative 2A, Alternative 1B, and Alternative 1A. As described above, even with the numerous project design features to reduce these impacts, they remain substantially adverse. As described above, although the restoration alternatives would have short-term impacts, the long-term ecological benefits

would be substantial relative to the No Project/No Federal Action Alternative. No long-term substantial adverse impacts were identified for any of the project alternatives.

Materials Disposal

CEQA: No significant impacts would result to biological resources from materials disposal; therefore, no mitigation measures are proposed.

NEPA: No substantial adverse impacts to biological resources would result from materials disposal; therefore, no mitigation measures are proposed.

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3.7 CULTURAL RESOURCES

This section discusses cultural resources within the cultural study area (see Figure 1-2). Cultural resources consist of sites, buildings, structures, objects, and districts or other places of human activity that are considered significant to a community, culture, or ethnic group. These resources may be historic or prehistoric in age, or a combination of both. The cultural study area refers to the entire boundary of San Elijo Lagoon. The proposed project area of potential effects (APE) is the extent of physical disturbance for the undertaking as shown in Figure 3.7-1. The APE does not include areas that would be temporarily flooded.

This EIR/EIS meets the requirements of both CEQA and NEPA. NEPA is being used to meet the requirements of Section 106 of the National Historic Preservation Act (NHPA). Under the NHPA, historic properties are any prehistoric or historic district, site, building, structure, or object included in, or eligible for, the National Register of Historic Places (NRHP) (36 CFR 800.16). Evaluation criteria for the NRHP are provided in 36 CFR Section 60.4 as detailed below in Section 3.7.2. Section 106 of the NHPA provides a consultation process for assessing effects of federal undertakings to historic properties. Section 106 requires federal agencies to consider the effects of their undertaking on historic properties. Furthermore, it requires an agency to afford the State Historic Preservation Officer (SHPO), any potentially affected Native American tribe(s), and the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on any of the agency's undertakings that could affect historic properties. Federal undertakings include federal projects, permits, grants, and loans. The purpose of Section 106 is to avoid unnecessary impacts to historic properties from federal undertakings. The Section 106 review process is described in the ACHP regulations (36 CFR Part 800, as amended August 5, 2004) and Corps implementing regulations at 33 CFR Part 325, Appendix C.

To comply with Section 106 of the NHPA, the Corps contacted the Native American Heritage Commission (NAHC) as well as Native American contacts identified by the NAHC to inform them of the proposed project and request information regarding the nature of cultural and Native American resources within the proposed project area. Tribal coordination was initiated on July 30, 2014. No comments or responses were received from the Native American contacts identified by the NAHC. The Corps will initiate and conclude Section 106 consultation with SHPO prior to the issuance of the ROD. If a Memorandum of Agreement (MOA) or Programmatic Agreement (PA) is necessary to address adverse effects on historic properties, then the terms of the MOA or PA would be incorporated into the Corps' final permit decision.

Under CEQA, important significant resources are those that meet one or more of the evaluation criteria for the California Register of Historical Resources (CRHR). The CRHR criteria are modeled after the NRHP criteria. Sites that are eligible for the NRHP are automatically

considered eligible for the CRHR. CEQA also applies to archaeological resources that do not meet the criteria of a historical resource, but do meet the definition of a unique archaeological resource in PRC Section 21083.2, as follows:

An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- (1) Contains information needed to answer important scientific research questions and a demonstrable public interest in that information.
- (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

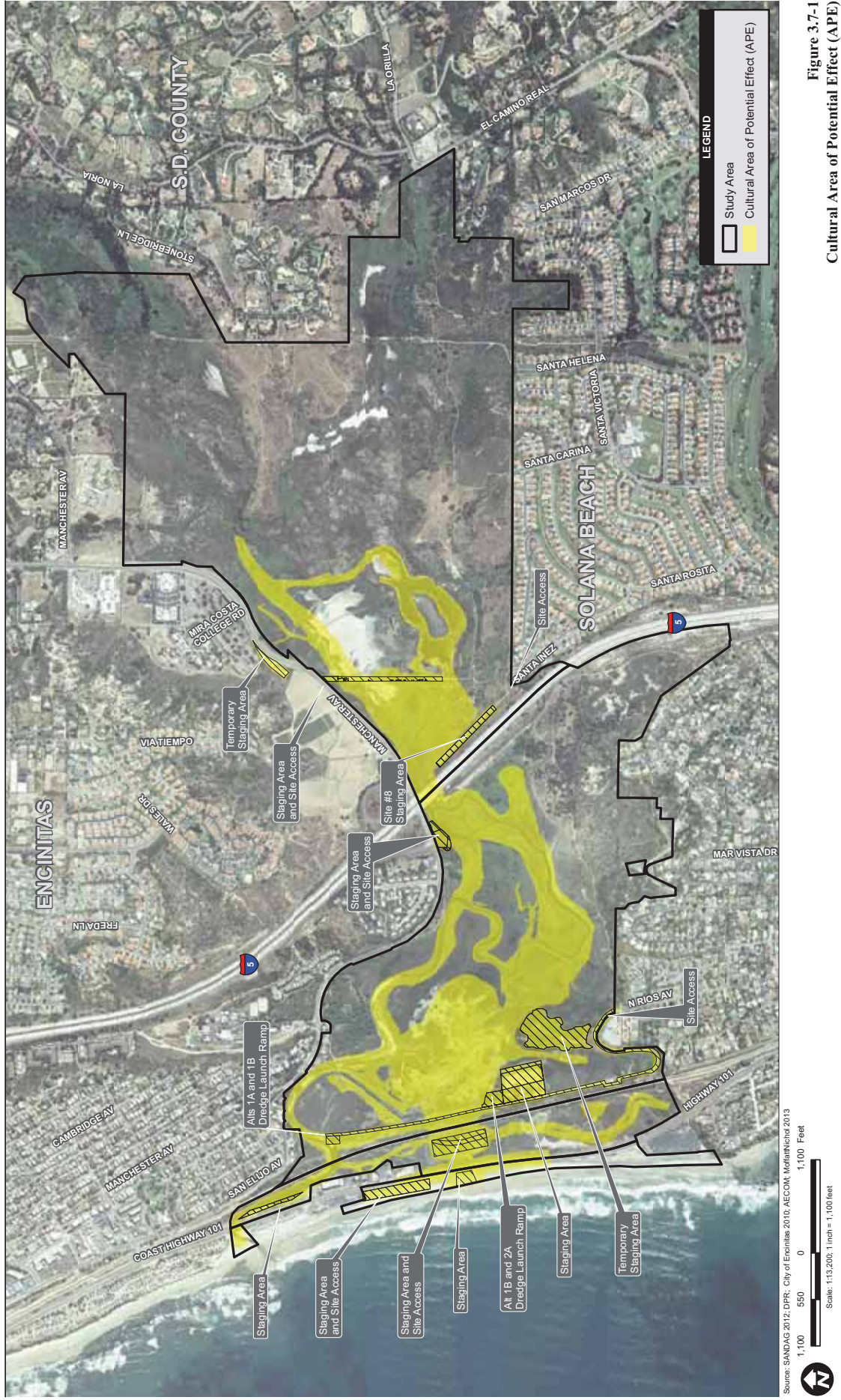
The assessment of the project's potential to have an adverse impact on cultural resources is based on the baseline conditions described in the following technical resource study: "*Archaeological Survey in Support of the San Elijo Lagoon Restoration Project Environmental Impact Report/Environmental Impact Statement, San Diego County, California*" dated January 2014 and prepared by AECOM. The results of this analysis are presented below and the study is included as Appendix I to this EIR/EIS with confidential records and maps on file at the County DPR and deposited with the South Coastal Information Center (SCIC). This section summarizes the more detailed technical report prepared by AECOM in 2014 (Appendix I).

3.7.1 AFFECTED ENVIRONMENT

This section provides an overview of the current understanding of human occupation of the California coast and lagoons/estuaries like San Elijo from 8,000 to 9,000 years ago to the more recent history of the 20th century. The San Elijo lagoon area has been extensively studied and 30 previously recorded cultural resources are within 300 feet of the cultural study area. A pedestrian survey was performed in non-lagoonal sediment areas by AECOM cultural resources staff in November 2012 as part of this EIR/EIS. Areas where sites were previously recorded were also surveyed to determine the current nature and status of these resources.

Regional Prehistory and History

By about 8,000 years ago, it appears that the rise in sea level began to slow, allowing the formation of productive bay, lagoon, and estuary habitats at many locations along the San Diego



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County coastline (Carbone 1991; Masters and Gallegos 1997), including at what is known today as San Elijo Lagoon (Byrd et al. 2004). These habitats seem to have supported a substantial coastal population during the early Archaic. At San Elijo Lagoon, data suggest that the lagoon was closed to tidal circulation between about 3,500 and 1,100 years ago and may have resulted in a population movement inland and southward in response to siltation and declining productivity of coastal lagoons in the northern portion of the county.

By the time the Spanish arrived in California, the project area was within the territory of a loosely integrated cultural group historically known as the Kumeyaay, or Northern Diegueño. Major ethnohistoric villages in the vicinity of the proposed project were *Kuiauma* near the mouth of San Elijo Lagoon and *Hapai* on the San Dieguito River, approximately 5 miles east of the lagoon (Krober 1925).

Europeans first entered the project region in 1769, when members of the Spanish Portola expedition crossed through the area (Brown 2001). For the next nearly 80 years, the area around San Elijo Lagoon remained largely undeveloped and was used mainly for grazing and agriculture. Major transportation routes developed along the coast in the early 20th century and included the Coast Route (later known as Coast Highway 101) and the Atchison, Topeka, and Santa Fe Railroad. During the 1920s, the communities of Solana Beach, Encinitas, and Rancho Santa Fe began to develop around the lagoon (Pryde 1992; Moyer 1969). To meet the need for improved transportation routes, I-5 was developed along coastal San Diego County.

Existing Cultural Records Search Results

A records and literature search was conducted in July 2012 at the SCIC to provide information on previous cultural resources surveys and known previously recorded cultural resource sites within a 300-foot radius of the cultural study area. Also consulted were the 2012 RBSP EA/Final EIR (SANDAG 2011), addressing sites proposed as part of the materials disposal/reuse component, and a cultural resources management technical report for San Elijo Lagoon (Byrd et al. 2004). Information from the San Elijo Lagoon Double Tracking project cultural report regarding the NRHP assessment of cultural resources within the railroad improvements footprint was provided by SANDAG (SANDAG 2014). Although it did not provide information regarding cultural resources, a geotechnical sampling study (URS 2012) was consulted for depths of sediments in the lagoon. The 2012 RBSP provided information on the presence/absence of cultural resources at offshore placement sites and nearshore and onshore receiver sites for both programs. The study by Byrd and others documents the results of National Science Foundation (NSF)-funded archaeological and paleontological investigations on prehistoric hunter-gatherers at San Elijo Lagoon. The investigations included a paleoreconstruction based on a coring program and other environmental data, and archaeological excavations and artifact analyses of

eight prehistoric shell middens or shell scatters in the lagoon. The focus of the coring program, conducted in the eastern and upper portions of the lagoon, was to provide data regarding paleoenvironments, also revealed sediment deposits ranging from approximately 35 feet to 105 feet in depth in those areas. The research sources revealed that much of the cultural study area has undergone intensive pedestrian survey for cultural resources, resulting in the identification of 21 prehistoric archaeological sites, seven historic archaeological sites, two sites with both prehistoric and historic components, and four historic structures. No isolated artifacts were previously recorded within the cultural study area.

Archaeological Resources

Previous investigations have recorded 30 archaeological sites within 300 feet of the cultural study area (Figure 1-2) (Table 3.7-1) and none within the materials disposal/placement study area. One additional site, CA-SDI-20,816, was identified during the intensive pedestrian surveys conducted within the cultural study area in support of this document (Wahoff and Cooley 2012). Ground visibility was generally moderate to high. Most of these archaeological resources have not been formally evaluated for eligibility and are therefore considered potentially eligible for the NRHP. Examination of the digital records search information provided by the SCIC and surveys conducted by AECOM archaeologists revealed that none of the previously identified cultural resources or newly identified CA-SDI-20,816 site are within the APE for Alternative 2A, Alternative 1B, Alternative 1A, or the No Project/No Federal Action Alternative.

The majority of the sites within the cultural study area are prehistoric (considered here to be before the Gaspar de Portolá expedition of 1769). These sites located around the margins of the lagoon provide evidence of the extensive prehistoric use of lagoon and estuarine resources. Of the 21 prehistoric sites recorded within 300 feet of the APE, four are shell scatters or shell middens, one is a temporary camp with three loci, and another 12 are sites that can be generally categorized as lithic and shell scatters although most also contain other cultural materials (e.g., hearth, ceramics, groundstone, faunal bone, and/or fire-affected rock). One site (CA-SDI-18,009) contains a range of cultural materials, which is suggestive of stable occupation rather than short-term use. The cultural materials recovered consisted of shell, flaked and groundstone artifacts, ceramics, bone tools, ornaments, hearths, and a dog burial. Among the prehistoric sites are two that appear to lack shell, including a groundstone and lithic scatter and a midden with groundstone and a hearth.

One additional prehistoric site with a shell midden, mortars, and a pestle (CA-SDI-13,754) has been recorded along the open coast and extends into the ocean. The submerged portions of this resource may represent a secondary deposit from cliff erosion, rather than an inundated site. Numerous submerged prehistoric sites have been recorded off the coast of southern California, identified mainly by the presence of stone grinding implements (Masters 1983).

Table 3.7-1
Archaeological Sites within 300 Feet of the Lagoon Study Area

Resource Number	Component	Description
CA-SDI-CA-SDI-214	U (most likely P)	No descriptive information was provided on the site record regarding what type of site.
CA-SDI-215	M	Shell midden, lithic scatter, historic trash scatter dating to the 1940s, and a flexed human burial was discovered in 1935 during road grading. The site was partially destroyed by railroad construction in 1998.
CA-SDI-216	P	Large shell and lithic scatter.
CA-SDI-4546	P	Groundstone and lithic scatter.
CA-SDI-4574	P	Shell midden, groundstone and lithic scatter, 2 pieces of ceramic, hearth feature.
CA-SDI-4575	P	Shell, groundstone and lithic scatter, fire-affected rock.
CA-SDI-4576	P	Shell and lithic scatter.
CA-SDI-6848	P	Shell midden, groundstone and lithic scatter, fire-affected rock
CA-SDI-6850	P	Large shell midden, lithic scatter, hearth feature. The site has been partially destroyed by road construction.
CA-SDI-6852	P	Lithic and shell scatter.
CA-SDI-6853	P	Shell midden, flaked lithic scatter, 2 manos, fire-affected rock.
CA-SDI-6854	H	Four concrete foundations associated with a circa 1915 kelp processing factory.
CA-SDI-6856	H	Two cement foundations, fish pond.
CA-SDI-6857	H	Two historic house foundations and a well site.
CA-SDI-6858	H	Historic water line and pilings circa 1928.
CA-SDI-10,220	P	Temporary camp with three loci.
CA-SDI-10,645	P	Shell, ceramic, and lithic scatter; 1 mano fragment.
CA-SDI-13,754	P	Shell midden, sandstone mortars, pestles.
CA-SDI-13,903	P	Shell and lithic scatter, mammal and fish bone, charcoal.
CA-SDI-14,148	M	Shell scatter, cement stem-wall foundation and well or cistern, historic artifacts found during testing.
CA-SDI-14,149	H	Historic foundation and cistern.
CA-SDI-14,150	P	Shell scatter.
CA-SDI-14,796	H	Half-basement, cement foundation, privy, cistern, and trash scatter.
CA-SDI-16,385H	H	Santa Fe Railroad segment and bridge
CA-SDI-17,376	P	Shell and lithic scatter, fire-affected rock.
CA-SDI-17,397	P	Shell scatter, hearth features.
CA-SDI-17,398	P	Shell midden, lithic scatter, charcoal, groundstone artifacts.
CA-SDI-17,400	P	Midden, hearth, groundstone artifacts.
CA-SDI-18,009	P	Shell midden, mammal bones, lithic and ceramic scatter, groundstone artifacts, shell beads, bone tools and beads, 5 hearths, fire-affected rock, 1 dog burial, glass fragments, slate pendant.
CA-SDI-20,816	P	Shell scatter.
SDM-W-80	P	Shell midden.
P-37-029481	H	Railroad alignment, wood pilings; abandoned.

H = Historic M = Multi-component P = Prehistoric U = Undefined

No descriptive information is available for site CA-SDI-214. Based on the site number (numbers are assigned sequentially), it is one of the earliest sites recorded in San Diego County. The mapped location of the site is entirely developed and it has likely been destroyed.

Two sites have prehistoric and historic components. These are a shell midden, lithic scatter with a human burial, and a 1940s trash scatter; and a site with a shell scatter, cement foundation, well or cistern, and historic artifacts. The prehistoric and historic components are unrelated to one another.

Seven of the archaeological sites within the cultural study area are historic in nature. These include remnants of an early 20th century kelp processing factory; building foundations and a well representing former residences; cement foundations and a fish pond; a half-basement, cement foundation, privy, cistern, and trash scatter; historic foundations with an associated cistern; a historic waterline; and an approximately 1,000-foot-long section of an abandoned alignment of the Santa Fe Railroad. The segment is adjacent to the existing NCTD railroad. Although not included in the records search results for this cultural study, a segment of the Santa Fe Railroad and the bridge are also located in the cultural study area. As discussed in Section 2.3, planned improvements to the NCTD railroad by SANDAG in partnership with NCTD include replacement of the bridge over San Elijo Lagoon. The segment of the Santa Fe Railroad would be addressed as part of that study.

Native American Consultation

The NAHC was contacted by AECOM in July 2012 for a search of their Sacred Lands files. The search identified no Native American traditional cultural properties, or resources of religious or cultural significance to Native Americans within the APE. The NAHC provided a list of interested tribes and persons. An information letter, map, and response form were sent to each of the tribes and persons on the contact list. A Native American monitor was not present during the surveys. Responses to the contact program consisted of requests for a Native American cultural monitor to be present during activities associated with the project, a copy of the cultural technical report, and additional information regarding activities proposed for the project. Contacts and responses are provided in Appendix I. Additionally, the Corps contacted the NAHC in July 2014 requesting a search of their Sacred Lands files as well as a Native American contacts list. Tribal coordination letters were sent on July 30, 2014, to all contacts identified by the NAHC. No comments were received in response to the Corps July 30, 2014 letter.

Historic Structures

Four historic resources have been identified within the cultural study area area, including a segment of a historic road and three bridges. The first resource, a segment of Coast Highway 101

(P-37-033047), is well over 50 years old, but has been widened and improved many times over the years and its setting has been altered with the introduction of modern-era developments. Local modifications to Coast Highway 101 occurred as recently as 2013 as part of the Coast Highway 101 Westside Improvements just south of the lagoon in Solana Beach. Although the alignment of the highway segment (P-37-0033047) has not been altered, the roadway itself does not appear eligible for listing in the NRHP or CRHR due to loss of integrity. The three bridges, Bridge Nos. 57C0210, 570458L, and 570458R, have been previously evaluated in the Caltrans Historic Highway Bridge Inventory and listed as Category 5, not eligible for the NRHP (Caltrans 2013). The bridges are also considered not eligible for the CRHR.

The cultural resources evaluation for the San Elijo Lagoon Double Tracking project evaluated three historic resources within the railroad project footprint within the lagoon (SDI-215/H, SDI-6854H, and SDI-16385), as well as the Santa Fe Railroad (CA-SDI-16385H) and bridge number 240.4, a timber bridge built in 1942, and determined that these resources were not eligible for listing in the NRHP (SANDAG 2014).

The records and literature search indicates that no historic buildings are within 300 feet of the cultural study area. No potentially eligible historic properties or historical resources for the purposes of CEQA have been identified within the APE. Thus, no impacts to historic resources are anticipated.

3.7.2 THRESHOLDS OF SIGNIFICANCE

The criteria used to evaluate resources that may be affected by this project must be considered at the federal, state, and local levels. The federal criteria for evaluation are those provided in the NHPA. The NRHP criteria are presented in 36 CFR 60.4 as follows:

The quality of significance in American history, architecture, archeology, and culture is present in districts, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

- D. That have yielded, or may be likely to yield, information important in prehistory or history.

A cultural resource is considered “historically significant” under CEQA if the resource meets the criteria for listing in the CRHR. These criteria define an “important” archaeological resource as one which:

1. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage; or
2. Is associated with the lives of persons important in our past; or
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possess high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

As discussed in Section 3.7.1, unevaluated resources are considered potentially eligible for listing in the NRHP and the CRHR and are treated as eligible for the purposes of impact/effect analysis.

Any resource that is determined to be significant at the federal or state level is also significant at the local level. Resources that are not listed or eligible for listing in the NRHP or CRHR may be determined to be significant at the local level and eligible for the San Diego County Local Register. Criteria determining eligibility for the County Register are similar to those of the NRHP and CRHR, but the resource is evaluated with respect to San Diego County’s history and cultural heritage (County of San Diego 2007).

A significant impact related to cultural resources would occur if implementation of the proposed project would:

- A. Directly, indirectly, or cumulatively damage or destroy a significant historic or archaeological resource as defined above by NHPA and CRHR, and criteria for eligibility for the San Diego County Local Register; or
- B. Cause a direct or cumulatively substantial change in the significance of a historical resource. Substantial adverse change in the significance of a historical resource includes demolition, destruction, relocation, or alteration of the resource (archaeological, historical, or human remains) or its immediate surroundings to the extent that the significance of the resource is materially impaired.

The CEQA thresholds of significance for cultural resources are derived from legal definitions set forth in the NHPA and CRHR, as well as Section 15064.5(b) of the State CEQA Guidelines. The thresholds are functionally identical to those suggested by the County.

3.7.3 ENVIRONMENTAL CONSEQUENCES

Impacts to historic properties, cultural resources, or CRHR-eligible resources may be either direct or indirect. Direct impacts are caused by and are immediately related to a project such as ground-disturbing activities. Indirect impacts are not immediately related to the project, but they are caused indirectly by a project. An indirect impact is to be considered only if it is a reasonably foreseeable impact that may be caused by the project. An example of an indirect impact would be the placement of a pedestrian bridge next to a cultural resource, which could impact cultural resources indirectly through the surface collection of artifacts by bridge users. Indirect impacts can also occur as a result of changes to the setting or feeling of an NRHP- or CRHR-eligible cultural resource. The resources most often affected include historic buildings, structures, objects, or districts, as well as areas used by Native Americans for ceremonial or traditional activities. Direct impacts to historic properties, cultural resources, or CRHR-eligible resources occur as a result of ground-disturbing activities.

Activities common to Alternative 2A, Alternative 1B, and Alternative 1A would include dredging, grading, removal of material from the lagoon, flooding, use of staging areas, access road improvements, and construction of new access roads. Alternative 2A ground disturbance would also include demolition of a portion of the existing Coast Highway 101 roadway and construction of a new Coast Highway 101 bridge at the location of the proposed new inlet to the lagoon. Seismic retrofits to the existing Coast Highway 101 bridge would occur under Alternative 1B and Alternative 1A.

Both the temporary and permanent activities involving ground disturbance would have the same effect (either direct or indirect) on historic properties, cultural resources, or CRHR-eligible resources; therefore, they are addressed together in this impact analysis.

Special conditions are included in all Corp permits in accordance with 33 CFR 325.5(a)(2), Part 325 (Appendix A), Part 325 (Appendix C, Paragraph 11), and 36 CFR 800.13 that mandate cultural resources monitoring and require work to stop and notification of the Corps if cultural artifacts are discovered during project activities.

Lagoon Restoration

Alternative 2A

While there is archaeological evidence of extensive prehistoric use and occupation within the cultural study area, no known cultural or eligible historic resources are located within the APE for Alternative 2A. Because the proposed project is dredging to restore wetland habitat and function within San Elijo Lagoon, there would be no increase in non-project-related pedestrian traffic in the vicinity of cultural resources nor would the project result in alteration of setting in the vicinity of the cultural resources. **Therefore, no indirect impacts to cultural resources would occur under Alternative 2A (Criterion A).**

As discussed in Section 3.7.1, dense fluvial and colluvial sediments accumulating in the lagoon could potentially have buried intact cultural deposits that remain at former terraces and lagoon margins that are now underwater. Numerous geotechnical exploratory sampling programs (URS 2012; Corps 2002; Laton 2002; SELC 2000) and a recent summary of prior sampling results (M&N 2010) have identified lagoon deposits and sand throughout proposed dredging locations, including channels, basins, and the sediment trap, which would be overdredged to minus 40 feet below sea level. Dredging activities would therefore have little potential to encounter intact cultural resources in these areas.

Within the APE, an existing access road bisects a portion of eligible resource CA-SDI-13,903. Minor road improvements, such as shallow surface grading along the road alignment, may be necessary to safely accommodate construction traffic, but staging and access roads would be sited at existing access points and previously disturbed areas, where feasible, minimizing these disturbances (PDF-20). Exclusionary fencing would be placed along the access road in the vicinity of CA-SDI-13,903 to further minimize the potential for disturbance to the site. Construction equipment and vehicles would be restricted to the staked limits of disturbance (PDF-4), and because intact cultural deposits could still exist under the limits of disturbance by the road, no grading would occur to the segment of the road through the site. However, **it is possible that accidental disturbance to nearby cultural resources could occur during use of the access road and result in a potentially significant impact under CEQA (Criteria A and B).** Because no known cultural resources are located within the APE, project design features are included to minimize potential for accidental disturbance, and cultural resource monitoring would be required as a condition of the Corps' final permit decision, **this potential impact is not considered substantially adverse under NEPA.**

Some areas beyond the APE may be subject to temporary controlled flooding to provide necessary water depth for dredging operations. The temporary flooding necessary for appropriate

water depth for dredging operations is not considered a potential source of adverse impact to nearby cultural resources as the floodwaters would be still with no high velocity or continuous wave action that could result in erosion or scouring. The areas of flooding would be within current and historic levels of lagoon inundation.

Under Alternative 2A, a section of the Coast Highway 101 roadway would be demolished for the proposed new inlet to the lagoon, and a new bridge constructed. It is possible that undiscovered buried cultural deposits, including human remains, may exist on stable sediments in the proposed inlet/bridge vicinity that would be exposed during demolition of the roadway, or buried under lagoon sediments. **Because bridge/inlet areas of excavation would be in locations with the possibility for cultural resources to be present, and because of the known presence of cultural resources in immediate proximity to the lagoon, the project could result in a significant impact to undiscovered buried cultural resources under CEQA (Criteria A and B). Because no known cultural resources are located within the APE and cultural resource monitoring would be required as a condition of the Corps' final permit decision, this potential impact is not considered substantially adverse under NEPA.**

Alternative 1B

No previously recorded cultural resources or eligible historic properties are located within the proposed APE for Alternative 1B. There are known cultural resources in immediate proximity to the lagoon, but because dredging activities would be confined to sediments above buried stable surfaces, there would be little potential to encounter such resources. This alternative would not result in a new Coast Highway 101 bridge/inlet, thereby avoiding the potential for buried cultural deposits identified under Alternative 2A.

A connector trail would be constructed as part of Alternative 1B that would serve to connect existing trails in the central basin to the existing Nature Center trails. The new trail would be aligned over the proposed transitional area that would be constructed of fill material. Since the new trail alignment would be located over constructed fill material and outside of known cultural resource sites, there would be minimal potential for indirect impacts related to trail use near cultural sites. Because the dredging of the lagoon would not result in increased pedestrian traffic within a cultural resource site or create an alteration to the setting of cultural resources, Alternative 1B would have no indirect impacts to cultural resources. There is a known cultural resource (CA-SDI-13,903) that is bisected by an existing access road. Construction equipment and vehicles would be restricted to the staked limits of disturbance (PDF-4), and because intact cultural deposits could still exist under the current limits of disturbance by the road, no grading would occur to the segment of the road through site CA-SDI-13,903. Accidental disturbance to the cultural resource could occur during construction use of the existing access road near site

CA-SDI-13903 and result in a potentially significant adverse impact. **Thus, Alternative 1B would have potentially significant impacts to cultural resources under CEQA (Criteria A and B). Because no known cultural resources are located within the APE, project design features are included to minimize potential for accidental disturbance, and cultural resource monitoring would be required as a condition of the Corps' final permit decision, this potential impact is not considered substantially adverse under NEPA.**

Alternative 1A

Similar to the Alternative 2A and Alternative 1B, no previously recorded cultural resources or eligible historic properties are located within the proposed APE for Alternative 1A. There are known cultural resources in immediate proximity to the lagoon, but because dredging activities would be confined to sediments above buried stable surfaces, (layers of alluvial and colluvial deposits that would not contain intact cultural resources) there would be little potential to encounter such resources. This alternative would not result in a new Coast Highway 101 bridge/inlet, thereby avoiding the potential buried cultural deposits identified under Alternative 2A. The dredging of the lagoon would not result in increased pedestrian traffic or an alteration to the setting of cultural resources. Thus, Alternative 1A would have no indirect impacts to cultural resources. There is a known cultural resource (CA-SDI-13,903) that is bisected by an existing access road. Construction equipment and vehicles would be restricted to the staked limits of disturbance (PDF-4), and no grading would occur to the segment of the road through site CA-SDI-13,903. Accidental disturbance to the nearby cultural resource could occur during construction use of the existing access road near site CA-SDI-13903 and result in a potentially significant adverse impact. **Thus, Alternative 1A would have potential substantial adverse effects and significant impacts to cultural resources under CEQA (Criteria A and B). Because no known cultural resources are located within the APE, project design features are included to minimize potential for accidental disturbance, and cultural resource monitoring would be required as a condition of the the Corps' final permit decision, this potential impact is not considered substantially adverse under NEPA.**

No Project/No Federal Action Alternative

If the No Project/No Federal Action Alternative is implemented, no project-related ground-disturbing activities would occur. **As a result, there would be no significant or substantial adverse direct or indirect impact to eligible historic properties and cultural resources (Criteria A and B).**

Materials Disposal

Proposed offshore materials disposal/placement sites are located within former RBSP receiver and borrow sites. The locations were addressed under those programs and no cultural resources or eligible historic properties were identified.

Alternative 2A

Offshore

While the possibility exists that submerged resources may be present along the continental shelf of southern California, as discussed in Section 3.7.1, no archaeological cultural resources have been identified within the offshore disposal locations. SO-5 and SO-6 were previously dredged and the placement of the dredged materials monitored for cultural resources as part of the 2001 and 2012 RBSPs, and they retain little or no potential for intact cultural resource deposits. Therefore, the placement of materials at offshore locations would have **no significant or substantial adverse direct or indirect impacts to cultural resources, or NRHP- or CRHR-eligible archaeological resources (Criteria A and B).**

Nearshore

No previously recorded cultural resources have been identified within the nearshore placement locations. Therefore, **the placement of materials at nearshore locations would have no significant or substantial adverse direct or indirect impacts to cultural resources, or NRHP- or CRHR-eligible archaeological resources (Criteria A and B).**

Onshore

No previously recorded cultural resources are located within the onshore placement areas. Therefore, the **placement of materials at onshore locations as beach nourishment or project-related fill would have no significant or substantial adverse direct or indirect impacts to cultural resources or NRHP- or CRHR-eligible archaeological resources (Criteria A and B).**

Alternative 1B

This alternative would rely on the same offshore, nearshore, and onshore scenarios as Alternative 2A; there are no previously recorded cultural resources in these locations; **thus**, placement of

materials **would have no significant or substantial adverse direct or indirect impacts to cultural resources or NRHP- or CRHR-eligible resources (Criteria A and B).**

Alternative 1A

This alternative would rely almost exclusively on the LA-5 offshore disposal site where there are no previously recorded cultural resources. Some minor onshore use of suitable material for project-related fill, similar to Alternative 2A, may occur. There are no previously recorded cultural resource sites in these onshore locations; **thus, placement of materials would have no significant or substantial adverse direct or indirect impacts to cultural resources or NRHP- or CRHR-eligible resources (Criteria A and B).**

3.7.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

The following mitigation measures are required for CEQA significant impacts. Avoidance measures, including cultural monitoring, would be required components of the Corps' final permit decision.

Project minimization and avoidance features incorporated into the project require that construction zones be staked off and that access roads be sited in previously disturbed areas to minimize the extent of ground disturbance.

Mitigation measures Cultural-1 through Cultural-3 would be required under CEQA for implementation of Alternative 2A. Mitigation measures Cultural-4 and Cultural-5 would be required under CEQA for implementation of Alternative 2A, Alternative 1B, and Alternative 1A.

Cultural-1 Implementation of Alternative 2A requires that an Archaeological Monitoring and Discovery Plan shall be prepared and implemented prior to the start of ground-disturbing activities at the new Coast Highway 101 bridge and inlet to identify areas with the potential for intact cultural deposits and provide protocols in the event archaeological material is encountered during construction of the project. If previously unknown resources are identified during construction, the lines of communication and measures outlined in the Monitoring and Discovery Plan would be followed, including applicable late discovery protocols per Section 106 of the NHPA. The Archaeological Monitoring and Discovery Plan shall include, but is not limited to, the following measures:

- Ground-disturbing construction activity shall be temporarily halted by the project archaeologist and/or Native American monitor at the location of the

find and redirected elsewhere until the find is assessed by a qualified archaeologist for eligibility to the NRHP and CRHR.

- If the find is determined by the project archaeologist in consultation with the Native American monitor to be potentially eligible for the NRHP or CRHR:
 - On stable surfaces, an exclusionary zone would be set up around the find and marked (e.g., lath and flagging or silt fencing).
 - The cultural resources principal investigator would contact the Corps and County DPR to formulate a plan for evaluation or avoidance through redesign.
 - Dredging or mechanical ground-disturbing activities would not resume in that location until the principal investigator is notified by the Corps and County DPR that activities may resume.
 - If the resource is located on state lands, the California SLC Assistant Chief Counsel will be informed of the discovery.

Evaluation procedures would include:

- subsurface excavation (in stable sediments),
- cataloging and laboratory analysis of recovered cultural materials,
- curation of the artifact collection at an approved regional facility, and
- preparation of a draft and final technical report pursuant to CEQA and NEPA documenting the discovery and addressing regional research issues, and
 - consultation with local Native Americans in accordance with Section 106 regarding the significance and treatment of any cultural resources encountered.

If any human remains are discovered, the Property Owner or their representative shall contact the County Coroner, the Corps, and the County DPR. Upon identification of human remains, no further disturbance shall occur in the area of the find until the County Coroner has made the necessary findings as to origin. If the remains are determined to be of Native American origin, the Most Likely Descendant (MLD), as identified by the NAHC, shall be contacted by the Property Owner or their representative in order to determine proper treatment and disposition of the remains. The immediate vicinity where the Native American human remains are located is not to be damaged or disturbed by further development activity until consultation with the MLD regarding their recommendations as required by Public Resources Code Section 5097.98 has been conducted. Public Resources Code

§5097.98, CEQA §15064.5 and Health & Safety Code §7050.5 shall be followed in the event that human remains are discovered.

Cultural-2 Implementation of Alternative 2A requires that cultural resources monitoring shall be required during mechanical excavation associated with the Coast Highway 101 bridge and inlet. A qualified archaeological monitor and Native American representative shall be present during mechanical excavations in sediments with the potential for NRHP- or CRHR-eligible cultural resources.

Cultural-3 Implementation of Alternative 2A requires that a training session for project construction personnel shall be conducted by a qualified archaeologist prior to the start of ground-disturbing activities at the Coast Highway 101 bridge/inlet. The training session shall include a review of required monitoring locations and communication protocols, types of cultural resources that might be encountered, cultural resources responsibilities, protection procedures, and avoidance measures.

Cultural-4 If human remains are encountered during the proposed project:

- Work at that location will be suspended and redirected elsewhere.
- Corps and County DPR will be immediately notified of the discovery.
- Remains will be left in place and exclusionary fencing will be placed in a 50-foot radius around the discovery.
- Under the provisions of the California PRC Section 7050.5, the County Coroner will be notified in the event of discovery of human remains.
- If the remains are either determined to be or there is reason to believe they are Native American, the coroner will notify the NAHC within 24 hours.
- Disposition of Native American human remains on non-federal lands is within the jurisdiction of the NAHC. The Corps and County DPR, as lead agencies for the proposed project, will initiate consultation with the NAHC. As part of the consultation process, the NAHC will notify persons most likely to be descended (MLD) from the remains. No ground-disturbing work will occur in the location of the remains until consultation between the NAHC, MLD, Corps, and County DPR has been completed, and notification by the Corps and County DPR that construction activities may resume.
- If the remains are discovered in situ, they will be left in place and covered with weather-proof materials such as a tarp or plywood. If they are

discovered in spoils, the remains will be placed in a labeled bag and, on approval by the MLD, transported to a secure locked container. An osteologist or a forensic anthropologist will, in consultation with the MLD, inspect fragmentary bones that are suspected to be human but cannot be identified as such in the field.

Cultural-5 Exclusionary fencing shall be used to avoid inadvertent disturbance of cultural resources in proximity to the APE, staging areas, and access roads. The temporary exclusionary fencing shall be placed parallel to, but outside of the APE, staging areas, or the access road's existing limits of disturbance in locations where they are within 15 feet. Specifically, exclusionary fencing shall be placed parallel to existing access roads used for construction access near site CA-SDI-13903.

3.7.5 LEVEL OF IMPACT AFTER MITIGATION

The above CEQA mitigation measures would provide for:

- Identification and monitoring of areas with the potential to contain intact cultural resources,
- Protocol for treatment of cultural resources and human remains if encountered during construction,
- Consultation with Native Americans regarding the sacredness of archaeological sites and proper treatment of cultural resources if discovered, and, if necessary,
- Recovery and curation of any identified resources with documentation in the form of a DPR form recordation and NEPA/CEQA-compliant cultural resources technical report.

CEQA Conclusion: Impacts to cultural resources and CRHR-eligible resources would be reduced to less than significant with the implementation of the mitigation measures above.

NEPA Conclusion: Based on review of the cultural resources documentation, the Corps has determined there are no known historic properties listed or eligible for listing within the APE. The inclusion of project avoidance and minimization measures, as well as the requirement for cultural resource monitoring as a condition of the final Corps permit decision, will avoid inadvertent impacts to potential currently unknown cultural resources within the APE, or known cultural resources in proximity to the APE. Preliminary application of the Section 106 Criteria for Identification and Evaluation of Historic Properties [36 CFR 800.4(d)] indicates a finding of "No Effect to Historic Properties" for the undertaking.

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3.8 PALEONTOLOGICAL RESOURCES

Paleontological resources are the fossiliferous remains or traces of prehistoric plant and animal life that are not connected with human cultural resources (Deméré and Walsh 2003). Paleontological resources (such as bones, teeth, shells, and wood) are found in geologic deposits within which they were originally buried and can provide a historic record of environmental conditions outside of human influence, depending on the age and characteristics of the formation. These resources represent a limited, nonrenewable, and sensitive scientific and education resource.

A variety of studies have been completed to characterize geologic formations and their potential for containing paleontological resources. This analysis relies on *Paleontological Resources, San Diego County California*, prepared by Thomas Deméré, PhD, and Stephen Walsh (Deméré and Walsh 2003), to identify the potential for resources in the study area as well as personal communication with Dr. Deméré of the San Diego Natural History Museum (Deméré 2012a). Based on past studies and findings throughout the San Diego region, local geologic formations have been assigned paleontological resource sensitivity, indicating their potential to contain paleontological resources of scientific importance. Resources could be disturbed as part of excavation activities, which are proposed for specific areas within and around the lagoon, as illustrated in Figures 2-12 through 2-14. No excavation is proposed as part of materials disposal/reuse. Therefore, this section focuses on the lagoon restoration efforts, including construction access roads and the proposed new bridge and lagoon inlet associated with Alternative 2A. Potential effects to paleontological resources that could be located within the excavation sites within the restoration area are identified, as well as any measures to reduce those impacts.

3.8.1 AFFECTED ENVIRONMENT

Due to the relationship between fossils and geologic formations in which they can occur, the geology of an area provides a reasonable basis for predicting the potential for the presence of paleontological resources. As discussed in Section 3.5 Geology/Soils, terraces and slopes within the study area are underlain by Delmar and Torrey sandstone formations (Td and Tt), topped by Lindavista red sandstone (Qt1-4). Sediment within the lagoon is generally classified as alluvium and colluvium (Qal).

Paleontological Resources, San Diego County California (Deméré and Walsh 2003) provides generalized potential sensitivity for different geologic deposits within San Diego County. The proposed project is located within the Coastal Plain region of the Peninsular Ranges Province. The Coastal Plain region is underlain by a “layer cake” sequence of marine and nonmarine

sedimentary rock units that record portions of the last 140 million years of earth history. Over this period of time, the relationship of land and sea has fluctuated drastically such that today we have ancient marine rocks preserved up to elevations of around 900 feet above sea level and ancient river deposits as high as 1,200 feet. Faulting related to the local La Nación and Rose Canyon fault zones has broken up this sedimentary sequence into a number of distinct fault blocks in the southwestern part of San Diego County, while in the northern area the effects of faulting are not as great and the rock units are relatively undeformed (Deméré and Walsh 2003). Descriptions of specific formations found within the restoration area are summarized below in Table 3.8-1.

Table 3.8-1
Paleontological Formation Characteristics and Sensitivity

Formation	Characteristics	Sensitivity
Later Quaternary Alluvium	Alluvial sediments of relatively recent age (i.e., generally younger than 10,000 years old). Consists of poorly consolidated clays, silts, sands, and gravels generally laid down by ephemeral streams.	Low
Delmar	Consists of greenish silty mudstones, brown siltstones, and greenish sandstones deposited in a lagoonal/estuarine setting. This formation supports well-preserved to poorly preserved remains of estuarine invertebrates and estuarine vertebrates.	High
Torrey Sandstone	Consists primarily of yellowish-white, coarse-grained, locally cross-bedded, arkosic sandstones deposited in an ancient nearshore marine environment. This formation has produced important remains of fossil plants and marine invertebrates.	Moderate
Lindvista	Represents a marine and/or nonmarine terrace deposit of early Pleistocene age (approximately 0.5–1.5 million years ago). Fossils collected from these sites consist of remains of nearshore marine invertebrates as well as sparse remains of sharks and baleen whales.	Moderate
Unnamed River Terrace Deposits	Deposits of coarse-grained, gravelly sandstones, pebble and cobble conglomerates, and claystones generally occur at levels above the active stream channels and represent the sediments of ancient river courses. These deposits have produced well-preserved remains of aquatic vertebrates and terrestrial mammals.	Moderate to High
Unnamed Marine Terrace Deposits	Deposits consist of a basal nearshore marine unit, producing large and diverse assemblages of marine invertebrate fossils, and an upper nonmarine unit, producing sparse remains of terrestrial mammals.	Moderate to High

Source: Deméré and Walsh 2003

Known Paleontological Resources

A considerable number of paleontological resources have been discovered in the areas immediately surrounding San Elijo Lagoon, particularly along the eastern shores. No paleontological resources have been identified or recovered from within the San Elijo Lagoon basins where restoration activities would be focused.

3.8.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to paleontological resources would occur if implementation of the proposed project would:

- A. Directly or indirectly destroy a unique paleontological resource or site; or
- B. Require grading or excavation that would disturb the substratum or parent material below the major soil horizons in any formation with a paleontological sensitivity rating of moderate or high (as assigned per Paleontological Resources, County of San Diego California [Deméré and Walsh 2003]).

These CEQA thresholds were derived from a combination of sources, including Appendix G of the CEQA Guidelines and the County Guidelines for Determining Significance for paleontological resources.

3.8.3 ENVIRONMENTAL CONSEQUENCES

This section discusses the environmental consequences, or impacts, associated with the proposed project on paleontological resources associated with the lagoon and impacted upland areas. Potential adverse, significant, or beneficial direct and indirect impacts are identified as appropriate.

As described above, a direct relationship exists between fossils and the geologic formations in which they are entombed; thus, with information specific to the geology of a particular area and the corresponding paleontological resource potential, it is possible to reasonably assess if fossils might or might not be found during excavation in native substratum material or bedrock formations. Because paleontological resources usually are irregularly dispersed throughout a geologic formation, both horizontally and vertically, the specific location of fossils within a particular formation cannot be predetermined.

Direct impacts to a paleontological resource could result from grading, excavation, trenching, boring, tunneling or other ground-disturbing activity that disrupts subsurface geologic formations and causes the destruction or alteration of a paleontological resource. Indirect impacts to paleontological resources are not specifically caused by development of a project, but rather may be a reasonably foreseeable result of such a project. An example of an indirect impact to paleontological resources could be the destruction or loss of surface fossils from increased erosion during or after completion of a project or the unauthorized tampering or removal of a fossil or paleontological resource from a project site. Actions that place material on top of

existing surface areas, such as building up dikes or placement of material to level a surface, do not have the potential to adversely impact subsurface resources.

Alternative 2A

The majority of project-related ground-disturbing activities would occur within portions of the lagoon basins that are generally underlain by alluvial deposits. As detailed in Section 3.8.1, later Quaternary alluvial deposits in San Diego County are assigned low paleontological resource sensitivity because of their young age. This indicates a low potential exists for paleontological resources to be present within the project area requiring excavation within the lagoon. Some other formations within the project area have higher paleontological resource sensitivity ratings; however, these formations typically occur on the terraces surrounding the lagoon rather than in the lagoon itself where ground-disturbing basin excavations would occur.

Deeper excavation activities, beyond those to remove dredge material from the basin floor, such as for the new inlet structure, Coast Highway 101 bridge foundations, channel deepening, or the site access roads, would be required as part of the proposed project. A considerable number of known paleontological resources have been identified in areas immediately adjacent to San Elijo Lagoon and this indicates a potential likelihood that additional resources may be located within sensitive underlying formations, such as the Delmar Formation that immediately surrounds a large portion of the lagoon area, with the most sensitive areas located generally to the east (Deméré 2012a). Excavation in the east basin, nearest to the most paleontologically sensitive formations toward the east end of the lagoon, would be limited to channel excavation and would not extend outside of the basin area. Current engineering shows deeper excavation activities, such as bridge footings, would extend only into upper soil layers and are not anticipated to reach underlying bedrock formations where sensitive paleontological resources may exist. Additionally, many of these deeper excavation locations would be in the western portion of the lagoon, near the coastline, where known locations of paleontological resources are not as concentrated. Areas of increased inundation due to flooding necessary for construction activities are not anticipated to experience increased erosion or other effects that could alter or damage the underlying higher sensitivity bedrock of the area and impact paleontological resources contained within those formations.

Generally, proposed staging areas and access roads would be sited at existing access points and previously disturbed areas, minimizing site preparation requirements. The majority of necessary site preparation would include minor grading and clearing to create level surfaces or expand usable area. However, some vegetation clearing, grading, and fill to widen the existing access road to accommodate construction and maintenance vehicles and equipment would be necessary. The proposed access road along the southern boundary of the lagoon, which would provide

access from North Rios Avenue, would be partially located outside of the lagoon basin. The Delmar Formation borders the entire southern boundary of the lagoon and the access road could extend into areas underlain by this highly sensitive paleontological formation. Paleontological resources have not been recovered in this immediate area (Deméré 2012b). Surface grading to improve (flatten or widen) the existing roadway may be required in focused areas, although it would be limited to shallow grading along the ground surface and would result in less than 5,000 cy of earth moved. The highly sensitive Delmar Formation occurs at or near the surface in this area, so excavation of any depth may have the potential to impact paleontological resources. Thus, these shallow grading activities may disturb the underlying sensitive formation, resulting in a potential for paleontological resources to be damaged or destroyed. **Grading within the Delmar Formation could destroy a unique paleontological resource or affect an area of underlying sensitive parent material with moderate to high sensitivity, and impacts are potentially significant under CEQA (Criteria A and B).**

Any grading along the road would remain shallow and limited to small areas, and no known paleontological resources are located in the immediate vicinity of the roadway; therefore, this impact is not considered substantially adverse under NEPA.

Once completed, the proposed project would not result in additional ground disturbance to parent materials or underlying formations. Ongoing maintenance dredging would occur but would be restricted to the alluvial area and to settled materials within the basins, rather than underlying materials.

Alternative 1B

As detailed under Alternative 2A, project-related ground-disturbing activities would occur within the lagoon itself in areas generally underlain by alluvial deposits that are assigned a low paleontological resource sensitivity. Alternative 1B would require excavation work around existing bridge supports for retrofitting activities, but would be engineered to extend only in subsurface soil layers and not into underlying bedrock formations where paleontological resources may be located.

Similar to Alternative 2A, the proposed access road extending from North Rios Avenue would be partially located outside of the lagoon basin and is potentially underlain by the Delmar Formation. Shallow surface grading to improve (flatten or widen) the existing roadway may be required in focused areas and may disturb the underlying sensitive formation, resulting in a potential for paleontological resources to be damaged or destroyed. **Grading within the Delmar Formation could destroy a unique paleontological resource or affect an area of underlying**

sensitive parent material with moderate to high sensitivity, and impacts are potentially significant under CEQA (Criteria A and B).

Any grading along the road would remain shallow and limited to small areas, and no known paleontological resources are located in the immediate vicinity of the roadway; therefore, this impact is not considered substantially adverse under NEPA.

Alternative 1A

As detailed under Alternative 2A and Alternative 1B, project-related ground-disturbing activities would occur within the lagoon itself in areas generally underlain by alluvial deposits that are assigned a low paleontological resource sensitivity. Alternative 1A would require excavation work around existing bridge supports for retrofitting activities, but would be engineered to extend only in subsurface soil layers and not into underlying bedrock formations where paleontological resources may be located.

The proposed access road extending from North Rios Avenue would be partially located outside of the lagoon basin and is potentially underlain by the Delmar Formation. Shallow surface grading to improve (flatten or widen) the existing roadway may be required in focused areas and may disturb the underlying sensitive formation, resulting in a potential for paleontological resources to be damaged or destroyed. **Grading within the Delmar Formation could destroy a unique paleontological resource or affect an area of underlying sensitive parent material with moderate to high sensitivity, and impacts are potentially significant (Criteria A and B) under CEQA.**

Any grading along the road would remain shallow and limited to small areas, and no known paleontological resources are located in the immediate vicinity of the roadway; therefore, this impact is not considered substantially adverse under NEPA.

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not require ground-disturbing activities nor result in the potential for increased erosion that could expose underlying soils or formations. Because no ground disturbance would occur, there would be no disturbance of paleontological resources or work within underlying sensitive parent material with moderate to high sensitivity. **Thus, no significant or substantial adverse direct or indirect impact would result (Criteria A and B).**

3.8.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Grading associated with the access road off North Rios Avenue could occur within the highly sensitive Delmar Formation, and impacts are potentially significant under CEQA (Criteria A and B). Other excavations would extend only into upper soil layers and are not anticipated to reach underlying bedrock formations where sensitive paleontological resources may exist. Mitigation measures Paleo-1 and Paleo-2 will be required under CEQA for excavation along that roadway that occurs within the Delmar Formation. Additionally, PDF-20 requires that access roads be sited in previously disturbed areas to minimize the extent of ground disturbance. No substantial adverse impacts were identified under NEPA; therefore, these measures are considered NEPA avoidance and/or minimization measures.

Paleo-1: A monitoring program during grading, trenching, or other excavation into undisturbed substratum or deeper bedrock beneath the soil horizons and a fossil recovery program shall be implemented per County mitigation standards for excavation equal to or greater than 2,500 cy in high or moderate potential areas. A County-approved paleontologist shall be contracted to perform paleontological resource monitoring and a fossil recovery program if significant paleontological resources are encountered during grading, trenching, or other excavation into undisturbed rock layers beneath the soil horizons in proximity to the Delmar Formation along the North Rios Avenue access road. The following shall be completed:

- A County-approved paleontologist shall perform the monitoring (and recovery, if necessary, and report preparation) duties pursuant to the most current version of the County of San Diego Guidelines for Determining Significance for Paleontological Resources. The contract provided to the County shall include an agreement that the grading/trenching/excavation monitoring will be completed. The contract shall include a cost estimate for the monitoring work and reporting.
- The cost of the monitoring shall be bonded.

Paleo-2: A final Paleontological Resource Mitigation Report that documents the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program shall be prepared, if excavation into the Delmar Formation occurs and monitoring is required.

3.8.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA: Impacts to paleontological resources would be reduced to less than significant with implementation of the mitigation measures above.

NEPA: No substantial direct or indirect adverse impacts to paleontological resources were identified.

3.9 VISUAL RESOURCES

Visual resources are composed of natural and built features that give a particular area its aesthetic qualities. These features form landscape character, or the overall impression an observer perceives of an area. Landforms, water surfaces, vegetation, and built features are part of the landscape character. This section first describes the visual character of the study area (lagoon and materials disposal/reuse locations), documents state and locally designated scenic resources, and then evaluates the proposed project and alternatives in terms of contrast.

3.9.1 AFFECTED ENVIRONMENT

San Elijo Lagoon Study Area

The study area for visual impacts includes San Elijo Lagoon and adjacent hillsides (about 1 to 2 miles distant) where there are public and private views of this feature. San Elijo Lagoon itself is located in northern coastal San Diego County and appears as a large natural feature at a low point, generally bounded to the north and south by the developed suburban hillsides of Solana Beach and Encinitas. The lagoon is a typical coastal wetland of San Diego, with a western connection to the Pacific Ocean and an eastern freshwater source (Escondido Creek). It is traversed by north-south infrastructure improvements, which include Coast Highway 101, NCTD railroad, I-5, and the CDFW dike, that constrain water flow and affect vegetation type. In addition, these infrastructure improvements present strong linear elements to viewers such as drivers on roads, hikers on lagoon trails, visitors at the Nature Center, and residences on the hillsides to the north and south. Generally west of I-5, the appearance is a mosaic of open water, unvegetated mudflats in earth tones, and low-growing vegetation in various hues of green with seasonal yellow and reddish cast (in the autumn and winter). These present muted colors and rounded elements with low to moderate contrasts between elements. Behind the dike and east of I-5, impounded freshwater has generated a vegetation system dominated by taller cattails and bulrushes, which make the vegetation system appear very thick and dense. There are pockets of open water as well. Moving upstream into Escondido Creek, the vegetation is characterized by taller trees, some that are deciduous so they are bare in winter and lush during the summer.

There are isolated areas of altered or developed lands within the lagoon, including the Nature Center at the very northern edge of the lagoon and accessed by Manchester Avenue, and abandoned sewage settling ponds just east of the railroad. Numerous dirt trails traverse the lagoon site, mostly on the upland edges of the Reserve. These trails appear as brown linear features crisscrossing the greens of the vegetation, but they are relatively narrow and modest in size. Because the SELC has an extensive education and community outreach focus, plus the lagoon is an attractive feature for birders and naturalists, a large number of visitors of all ages

come to the lagoon. Some electrical utilities also cross the site north to south and present signs of human intrusion (see Section 3.14 Public Services and Utilities). These features have not substantially diminished the overall character of the large, open, natural system.

Surrounding land uses to the north, generally north of Manchester Avenue, include residential, suburban development west of I-5, commercial uses at the interchange, agricultural uses just east of the interchange (with suburban homes on the hilltops above) and then a community college as Manchester Avenue eventually turns into a north-south roadway. Viewers in these northern locations generally include residents looking down from the hilltops that see the lagoon and, depending on their orientation, the Pacific Ocean to the west or developed hillsides in Solana Beach to the south. These viewers are in the near to middle distance (less than 0.25 mile to 1.5 miles). Viewers to the east of I-5 see the agricultural fields in the foreground, then the lagoon. Drivers and bicyclists along Manchester Avenue are elevated only modestly higher than the lagoon so they have reduced views, but the viewing distance depends on the viewers' elevation and their speed.

To the east, the development pattern is more rural-residential and the terrain more varied. The lagoon may be visible; particularly, the more dense vegetation at the creek and east basin, but there is not the same concentration of viewers oriented the same way. The nearest roadway, El Camino Real, is not adjacent to the lagoon so this feature is not highly visible.

The development pattern to the south is much like the north, particularly that area west of I-5. Homes are located on hilltops and those on the edges have views looking north at the natural-appearing lagoon, to the west at the open Pacific Ocean, and farther north at the developed hillsides of Encinitas. These views are also in the near to middle-ground distance (less than 0.25 mile to 2+ miles).

West of the lagoon is Cardiff Beach and the Pacific Ocean. This beach varies between cobble and sand depending on the season and other various beach nourishment activities. Viewers not focused on the ocean to the west can see large riprap along the edge of Coast Highway 101 and this is fairly consistent along the length of the study area. There is a small commercial area along Coast Highway 101 just south of the lagoon inlet so the viewer can see a multistory commercial building and a small cluster of restaurants with associated parking (known as Restaurant Row). The elevated structure of Coast Highway 101, and associated protective riprap, obscures views from the beach into the lagoon. Viewers on Coast Highway 101 have clear and close views of both the ocean and the lagoon for the nearly 0.75-mile-long stretch that parallels the lagoon. Because this is a four-lane road, with average daily traffic volumes over 20,000 trips, a large number of viewers are in this location. They are typically traveling at a rapid rate of speed (posted speed limit in the area ranges from 35–45 miles per hour [mph]) so their views would

last for minutes, at the most. There are bike lanes on Coast Highway 101 providing clear views of the lagoon and ocean at a slower pace.

Travelers on I-5 and the railroad would also have open views of the lagoon, looking both east and west for less than 0.75 mile. Like Coast Highway 101, these viewers would experience the ocean, hills in the distance, and the lagoon, but for a modest amount of time, generally 1 minute when traveling at the speed limit (freeway speed limit is 65 mph; train speed averages 50 mph). Heavy traffic would slow motorists down and prolong views of the area.

Materials Disposal Study Area

The various beach materials placement sites are characterized by cobbly or sandy beaches, typically backed by bluffs to the east with the ocean to the west. The bluffs are typically developed with residential uses. Some placement sites are adjacent to roads. Viewers of the sites are residents on the bluffs and visitors at the bluffs and down at the shore. The offshore and nearshore sites (LA-5, SO-5, SO-6, and offshore of Cardiff) are in the ocean and are not described further because they are located at distances not readily visible (LA-5 is approximately 28 miles southwest of San Elijo Lagoon, SO-5 and SO-6 are approximately 1 mile offshore) and activities to place materials at these sites include underwater pipelines that are not visible under the water surface and a transport barge that is a typical ocean vessel commonly used and seen along the coast. The specific characteristics and viewers of the onshore sites are discussed separately below.

Moonlight

The proposed Moonlight placement site is located at the foot of B and C streets at Moonlight Beach, north of the proposed project. The proposed site is approximately 770 feet long (0.1 mile). Residential uses occur adjacent to the site, to the north and south. The beach area is relatively flat but quickly slopes up to the east, north, and south. Public access is found at Moonlight Beach (B and C streets) and south at the D Street stairway. Popular surf breaks along this reach include D Street, Boneyards, and Swami's. The site viewscape contains a wider sand area and a park because in this location the bluffs trend easterly and open up to allow Cottonwood Creek to drain into the ocean. The City of Encinitas places approximately 1,000 cy of sand annually on Moonlight Beach to augment the naturally occurring sand that erodes into the ocean. North and south of the park, there is a narrow sand shelf from the cliffs to a cobble slope, then sand sloping to the water. Riprap has been placed at the base of the bluffs to protect residential structures and intermittent access stairs. Except when modified by projects such as the 2001 RBSP or 2012 RBSP, high tide comes to the base of the bluffs and the limited sandy beach

is not visible. The Moonlight site would have a combination of viewers from private residences, a popular public access, a park, and the beach.

Leucadia

Generally characterized with vegetated bluff tops, Leucadia is located approximately 4 miles north of the proposed project. The bluffs are vegetated near the top where the slopes are less steep, but at the base there are cobbles. The 2012 RBSP placed material at this site in fall 2012 so the cobbles are currently less exposed. Some sea caves in this area have been filled and the fill material is visible against the lighter, tan bluffs. At low tide, the sand and cobble beach is visible; however, at high tide, the waves typically crash against the cliffs. Development along this segment includes single-family residences, apartments, and condominiums, which are located approximately 80 to 100 feet above the beach on the bluff. The Leucadia site would have a combination of viewers from private residences and the beach.

Cardiff

The Cardiff site is typically characterized by cobble beaches and a steep, 10- to 15-foot berm south of Restaurant Row. The 2012 RBSP placed material at this site in fall 2012 so the cobbles are less exposed. The site parallels Coast Highway 101. The beach has large boulders surrounding the restaurants acting as the key barrier between these structures and the sea. The length of the roadway is also protected by riprap. No obstructions are between the materials placement site and restaurants. However, for motorists traveling on Coast Highway 101, the higher elevation of the road and the relatively steep drop-off to the beach reduce the view of the beach itself, and the primary focal point is the ocean. There are also distant views of this site for residences on the hills north and south of San Elijo lagoon. The Cardiff site would have a combination of viewers from Restaurant Row, motorists on Coast Highway 101, the beach, and distant views from private residences.

Solana Beach

The proposed placement site in Solana Beach is located just north of Estrella Street and extends approximately 4,700 feet (0.9 mile) south. Steep cliffs abut the placement site and the area consists of a gently sloping sand beach with scattered rocks and cobbles. Residential development and some commercial uses exist near the placement site along the bluffs. Views of the beach along this stretch are dependent upon the tides and the season. Prior to materials placement at this site by the 2012 RBSP (in fall 2012), no dry beach existed at high tide, as waves crashed directly against the cliffs. This recent sand placement project resulted in some sandy beach although it would be winnowed by time and tides. There is a small sandy beach at

Fletcher Cove, which sits above the high tide mark. At low tide, a low profile sand and cobble beach is typically visible below the cliffs. The Solana Beach site would have a combination of viewers from bluff top private residences and commercial uses and from the mostly cobble beach.

Torrey Pines

The Torrey Pines site is located approximately 6 miles south of the project site. Cliffs south of the site range in elevation from approximately 50 to 200 feet. The beach trail from the Torrey Pines State Reserve descends onto the beach, south of the placement site. With the exception of the parking area for the Torrey Pines State Reserve, no development exists in the vicinity of this site. Recreational viewers traveling along the hills north of Los Peñasquitos Lagoon have distant views of the sand placement site. The Torrey Pines disposal site would be one component of the viewscape, which includes the lagoon, beach, and steep hills of Torrey Pines State Reserve. This beach location was not augmented by the 2012 RBSP in fall 2012 and the material that was placed under the 2001 RBSP is no longer visible. The Torrey Pines site would have a combination of viewers from the State Reserve, Coast Highway 101, and the beach.

Light and Glare

The only source of lighting within the Reserve is the Nature Center. Nighttime lighting along Coast Highway 101 is from motor vehicles and “Restaurant Row,” where a variety of commercial and residential land uses contribute to the ambient lighting and brightness levels in the project area. Light poles are provided along I-5; however, the primary source of light and glare is from motor vehicles traveling along Coast Highway 101 and residences on the hilltops. Residences on the hilltops are well lit. Generally, the major sources of illumination for each of the possible materials placement sites are from streetlights, vehicle headlights, and interior and exterior building lighting (residential, office, commercial) in the surrounding land uses.

3.9.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to visual resources would occur if implementation of the proposed project would:

- A. Have a substantial adverse effect on a scenic vista or on valued focal points from public roads, trails, scenic highways, or recreational areas;
- B. Substantially detract or contrast with the existing visual character or quality of the site and its surroundings;

- C. Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway; or
- D. Create a new source of substantial light or glare, which would adversely affect daytime or nighttime views in the area.

The CEQA thresholds of significance for visual resources are derived from Appendix G of the State CEQA Guidelines and from the County Guidelines for Determining Significance for visual resources.

3.9.3 ENVIRONMENTAL CONSEQUENCES

Overview of Methodology

Lagoon restoration would temporarily impact the visual environment by introducing construction equipment inside the lagoon and changing the views of the lagoon during the construction time period. Alternative 2A would also result in changes at the Coast Highway 101 bridge and at the beach for a new inlet (Alternative 2A only). Alternative 1B, Alternative 1A, and the No Project/No Federal Action Alternative would not result in the new inlet/bridge. All alternatives, with the exception of the No Project/No Federal Action Alternative, would generate some material for disposal that would be placed in various locations, including beach sites. The significance of this visual change depends on a variety of factors, including the degree to which the project would be seen by potentially sensitive viewers, viewer attitudes and activities, the distance from which the project would be observed, and the extent the project would be consistent with established visual quality goals of the adjacent cities.

The anticipated visual impact of the proposed project was assessed in the field and based on a computer-generated visual simulation. Field and office evaluation was undertaken to document the visual contrast of the project based on the degree of change in line, form, color, and texture. Three levels of contrast were considered: weak, moderate, and strong. Weak contrast means minor or low visual contrast with the surrounding landscape, while strong contrast means the facilities would be highly evident or dominate a setting. Moderate contrast would be noticeable, but not dominant. Each alternative was also considered in terms of conformance with applicable goals and policies in the Encinitas and Solana Beach General Plans.

Sensitive Viewers

Visual sensitivity is dependent upon viewer attitudes, the types of activities in which people are engaged when viewing the project, and the distance from which the project would be seen.

Overall, higher degrees of visual sensitivity are correlated where people are engaged in outdoor recreational pursuits or participate in scenic or pleasure driving. Residential views can be considered visually sensitive as well. Conversely, visual sensitivity is considered low to moderate in industrial or commercial areas where the scenic quality of the environment does not affect the value of the activity.

For the lagoon restoration evaluation, sensitive viewers are identified as users of the Reserve or beach (trails or Nature Center), drivers along scenic roads (Coast Highway 101, I-5, and Manchester Avenue), and viewers on the northern and southern bluffs, primarily at the city-designated vista point (San Elijo Avenue and Kilkenny Drive, which overlooks the lagoon and coast) and the residential areas. The vista point reflects public sensitivity, which is valued more than the private views of residents. A total of seven key views are identified for evaluation (Table 3.9-1) and shown in Figure 3.9-1. A photograph at each location is provided in Figures 3.9-2 through 3.9-6.

Table 3.9-1
List of Key Views

Key View Number	Location	Representative Viewers	Sensitivity
Key View 1	Existing trail accessed from North Rios Avenue	Reserve trail user Residential viewers on hilltop homes in Solana Beach (private views)	High to moderate
Key View 2	Cardiff Beach	Beachgoer	High
Key View 3	Coast Highway 101	Scenic driver and cyclist	High
Key View 4	View Point of San Elijo Avenue and Kilkenny Drive	Visitor to scenic view point Residential viewers on hilltop homes in Encinitas (private views)	High to moderate
Key View 5	Nature Center	Reserve user	High
Key View 6	I-5	Scenic driver	High to moderate
Key View 7	Manchester Avenue	Scenic driver and cyclist	High

A computer-generated visual simulation is provided at Key View 1 to illustrate the changes to the site post-restoration. There is a simulation for Alternative 2A, (Figure 3.9-7) and for Alternative 1B (Figure 3.9-8). The simulations are not necessarily representative of exact project final design but provide a useful illustrative example.

For the materials disposal/reuse site evaluation, sensitive viewers were identified as public beachgoers and public recreational users, and to a lesser extent residential viewers at hilltop homes in Solana Beach and Encinitas, as summarized in Table 3.9-2.

Table 3.9-2
Representative Viewers at Materials Placement Sites

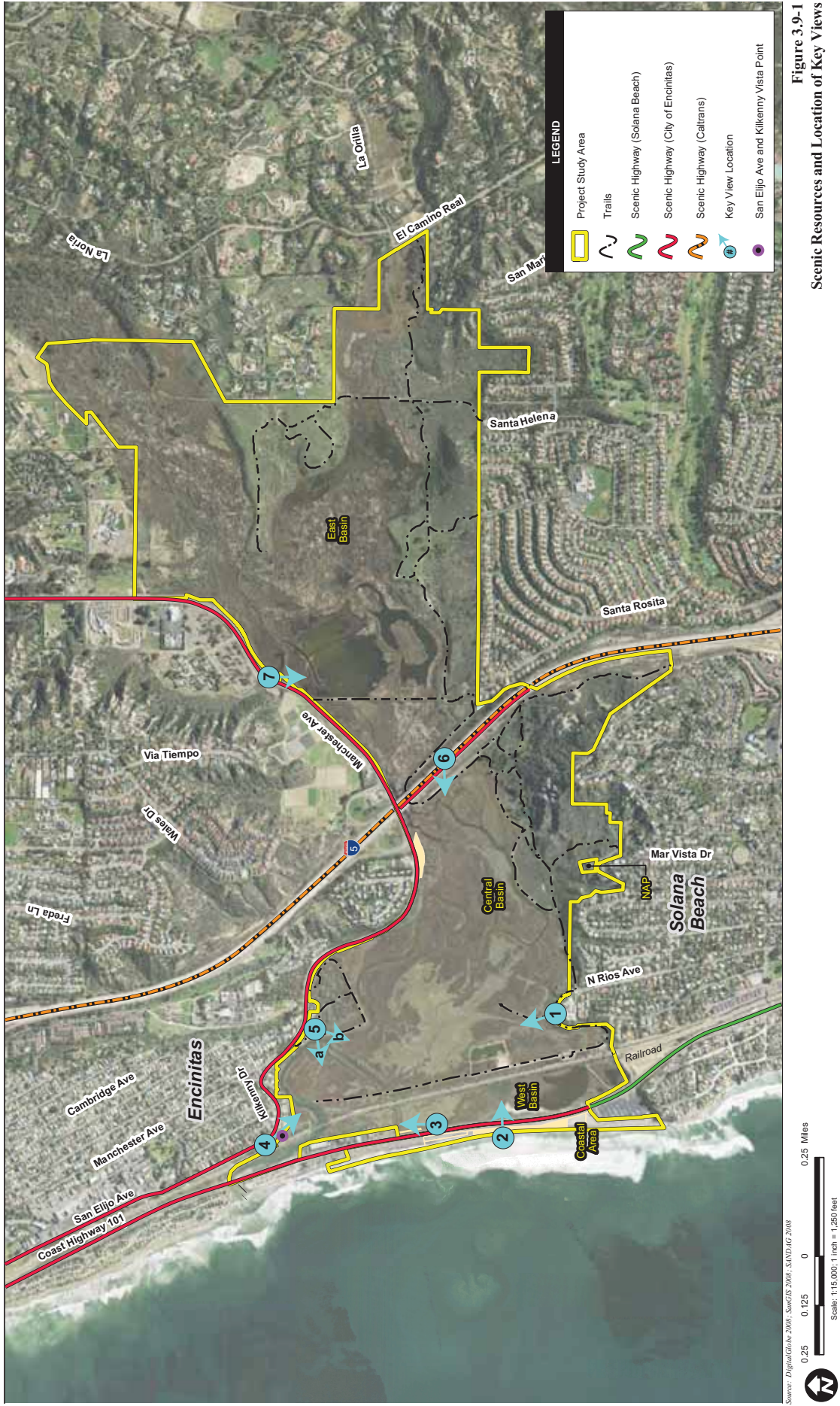
Location	Representative Viewers	Sensitivity
Moonlight	Park users Beach-goer Residential viewers (private views)	High to moderate
Leucadia	Beach-goer Residential viewers on hilltop homes (private views)	High to moderate
Cardiff	Beachgoer Scenic driver and cyclist Restaurant patrons Residential viewers on hilltop homes (private views)	High to moderate
Solana Beach	Beach-goer Commercial patrons Residential viewers on hilltop homes (private views)	High to low
Torrey Pines	Beachgoer Scenic driver and cyclist Torrey Pines State Reserve recreationalist	High

Lagoon Restoration

Lagoon restoration would generally consist of dredging and grading within the lagoon to raise or lower elevations, modifying existing lagoon inlet/channels to enhance tidal flow in and out of the lagoon, disposing of sediments excavated from the lagoon to different locations, and restoring graded areas within the lagoon to facilitate recovery of habitat. The construction phase of the proposed project would be temporary and is anticipated to begin January 2016 and would last up to 3 years. No buildings would be constructed as part of Alternative 2A, or either of the other build alternatives. Structural changes proposed would be a new inlet and bridge at Coast Highway 101 under Alternative 2A. The proposed restoration would also require maintenance so equipment would be periodically visible in the post-construction time period. The visible elements would vary substantially depending on the alternative.

No permanent new sources of lighting would be created under Alternative 1B or Alternative 1A. There is existing overhead lighting on Coast Highway 101; with the new bridge as proposed under Alternative 2A, there may be changes in the location of that lighting but it would be modest and incremental along this already lighted roadway. As such, no further analysis related to permanent lighting impacts is warranted.

The lagoon is bounded by designated scenic roads (locally designated Coast Highway 101 and Manchester Avenue) and traversed by an eligible state scenic highway (I-5). The restoration project would not change Manchester Avenue or I-5. Coast Highway 101 would be altered only



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Key View 1 - View from the trail looking north across the central and west basins of the lagoon

Figure 3.9-2
Key View 1 – Trail at North Rios Avenue

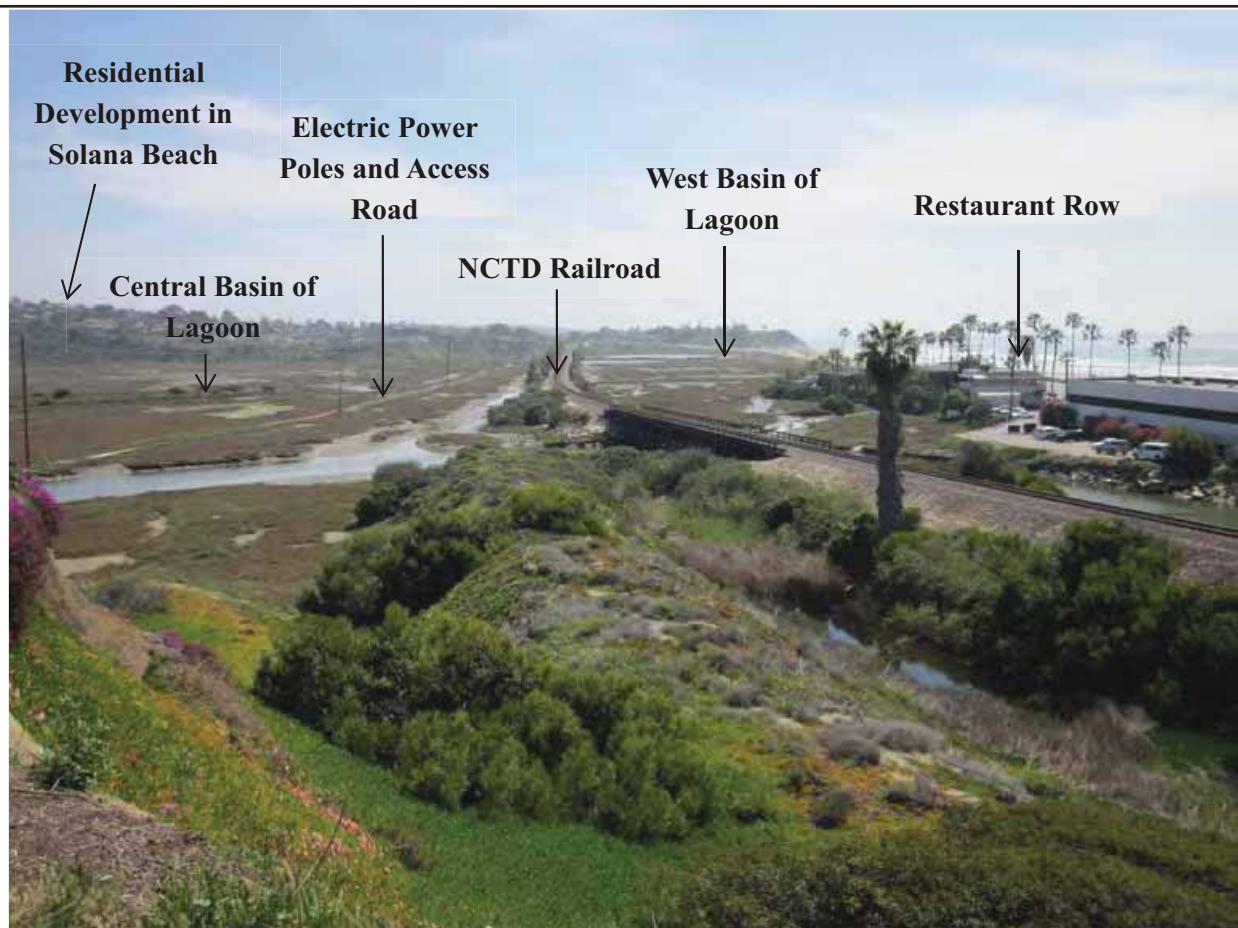


Key View 2 – View from Cardiff Beach looking south with Highway 101 to the east



Key View 3 – View from Highway 101 looking north

**Figure 3.9-3
Key View 2 and Key View 3**



Key View 4 - View looking southwest toward the central and west basins of the lagoon

Figure 3.9-4
Key View 4 –View Point at San Elijo Avenue and Kilkenny Drive

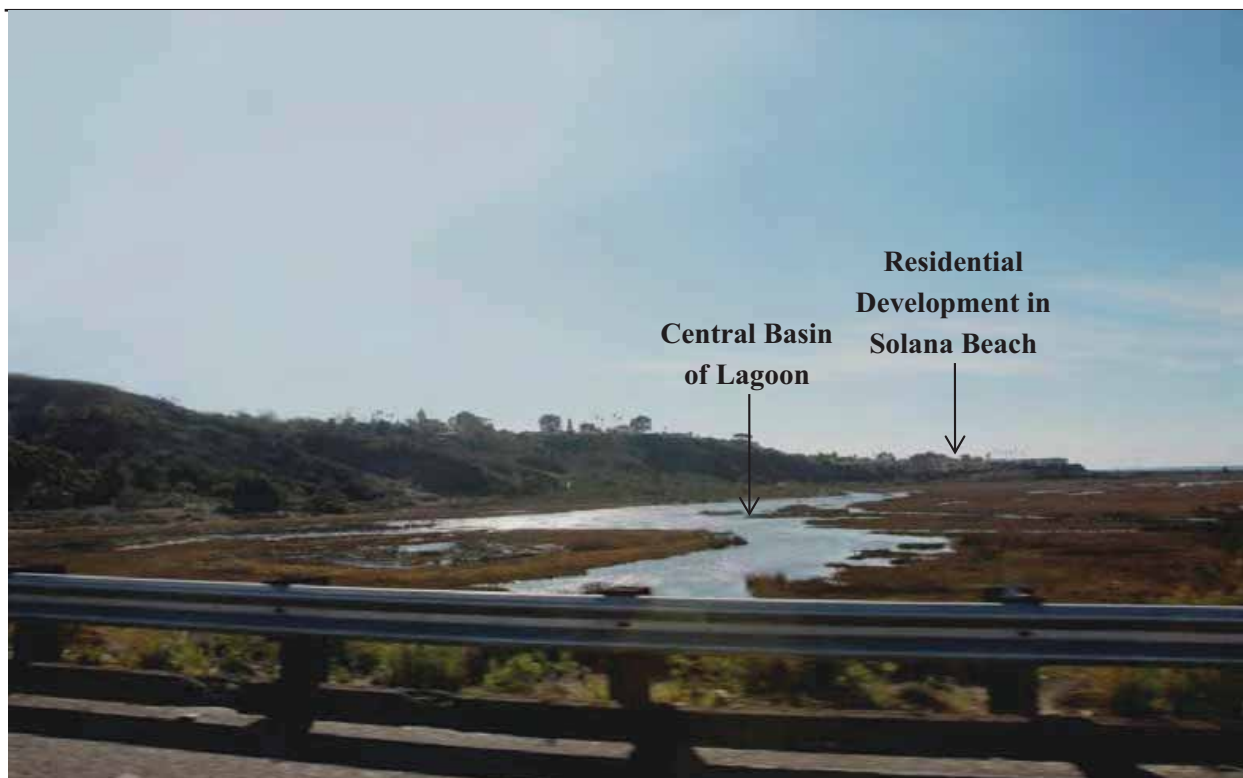


Key View 5a – View from the Nature Center looking northwest



Key View 5b – View from the Nature Center looking southwest

**Figure 3.9-5
Key View 5 – Nature Center**



Key View 6 – View from I-5 southbound lanes looking west toward the central basin



Key View 7 – View from Manchester Avenue looking southwest toward the east basin

**Figure 3.9-6
Key View 6 and Key View 7**



Key View 1 – Existing conditions at North Rios Avenue Trail looking north



Key View 1 – Alternative 2A Visual Simulation

**Figure 3.9-7
Alternative 2A Simulation at Key View 1**



Key View 1 – Existing conditions at North Rios Avenue Trail looking north



Key View 1 – Alternative 1B Visual Simulation

**Figure 3.9-8
Alternative 1B Simulation at Key View 1**

under Alternative 2A, as a bridge would be constructed over the new inlet. No trees, rock outcroppings, or historic buildings within a state scenic highway would be affected by Alternative 2A, or any of the alternatives, but changes would occur to the scenic lagoon itself. The visual changes to the lagoon as seen from scenic roads are encompassed by the analysis of key views under each alternative, specifically Coast Highway 101(Key View 3), I-5 (Key View 6), and Manchester Road (Key View 7).

Alternative 2A

During the construction phase, the visual character of the project site would change substantially from existing conditions. Vegetation would be removed from a large portion of the central basin and substantial landform alteration would occur. Such activities would be temporary but highly visible because of the contrast in color and texture with the vegetation being replaced by exposed soil. In some phases, necessary flooding would result in a greater area being underwater so the soil contrast may be reduced.

In either case, there would be construction equipment in atypical locations. Visual changes within the lagoon during the construction phase would include the presence of construction equipment, such as bulldozers, heavy trucks, and other standard equipment operating on land; a floating dredge operating on the water; lengths of pipeline extending through the lagoon area; equipment and materials stored in staging and laydown areas; and other typical construction activity. Additional construction-related features such as the enclosed structure containing the electrical power substation would be visible as part of construction activities as described in Section 2.10.2.

The lagoon and surrounding bluff areas have a high visual value due to the natural and open space aesthetic and unique habitat and conditions specific to the lagoon setting. The construction-related changes would include dredging and grading within the lagoon basins and would be highly evident at Key Views 1, 3, 4, 5, and 6. No changes would be made to existing bluffs surrounding the lagoon. Because of the elevation difference, viewers at Cardiff Beach (Key View 2) would not be able to see the changes to this basin. Viewers along Manchester Avenue in the east basin (Key View 7) would see the demolition of the CDFW dike and some grading, but the construction scale in this basin would not be as extensive as from other key views. Viewers at the San Elijo/Kilkenny vista point (Key View 4) would experience a strong contrast due to extended views of construction activities from this hilltop viewpoint and an expectation of seeing the lagoon in its natural condition from this site. Throughout the four phases of the approximate 3-year Alternative 2A schedule, construction equipment and activities would be visible at some locations within the lagoon area (i.e., construction material at staging areas, equipment operating within the lagoon basin, etc.). However, broad views of the Pacific

Ocean and hills in the distance would continue. Users of the trail system (Key View 1) and the Nature Center (Key View 5) would experience a strong contrast because of the overall change and likely perceived degradation in visual character, but also because these users have higher scenic expectations. Thus, the contrast would be strong as a result of construction activities. Overall, the construction phase would represent a temporary, but significant change in the visual quality and character of the lagoon for key viewers. **The temporary impact to trail users and vista point viewers would be significant and substantially adverse (Criteria A and B).**

The change in view would be noticeable for drivers along Coast Highway 101 (Key View 3) or Manchester Avenue. A portion of a scenic driver's view would be altered by the presence of the construction equipment in a portion of the lagoon and the remaining visual aesthetic across the rest of the lagoon; the expansive views of the ocean would remain for the driver's scenic viewing. However, this altered portion of the view is a relatively small area of construction equipment located in the overall context of the large lagoon area and expansive ocean views, both in the immediate viewing area. Additionally, it is not uncommon for construction activities to be visible within and around the lagoon due to ongoing maintenance activities, such as existing inlet excavation, that currently take place. While their expectation for an undisturbed scenic experience may not be met at all times during construction, the overall experience by scenic drivers would be extremely short term (a few minutes as they drive by) and other scenic elements would remain intact, specifically the Pacific Ocean. Therefore, **impacts to scenic drivers would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

The project would result in some temporary new light sources during 24-hour construction activities, but they would be periodic and small scale. Some construction activities would be restricted to daytime hours, but some activities require operation 24 hours a day to remain efficient (e.g., dredging activities). Additionally, activities like materials delivery may be scheduled for nighttime hours. It would be necessary to have 24-hour dredging operations over the course of the project. The light sources necessary during nighttime dredging operations would include illumination of the immediate surrounding area of work (both at the dredge in the water at the landing point at the staging areas) and lighting contained within the enclosed cabin area. Lighting would be comparable to bright street lights. The lights would be downshielded to direct the light down toward the area of work and minimize spillage or glare (PDF-7). A spotlight on the dredge may be used if anchors need to be reset (up to three times per night). In addition to the lights from the dredge, the crew boats delivering dredge personnel to the dredge at the shift change during dark hours (generally around 11 p.m. and 6 a.m.) would have a spot light used to temporarily illuminate the immediate boarding area and waters in front of the boat while transiting to and from shore and dredge plant. Lighting at construction launch or staging areas may also be necessary to facilitate nighttime activities, such as material

deliveries, and would also be similar to a street light directed toward the work area. The staging areas would be immediately east of Coast Highway 101 and one is near the already well-lit Restaurant Row. Some temporary lighting may also be required at booster pump locations during service and short-term checking by operations personnel. Although the lighting would be noticeable and visible to surrounding viewers and may appear out of place within the unlit lagoon area, the area that would be lit would be localized and focused on the immediate work area. The nighttime lighting would not create a substantial area of brightly illuminated space and would be of the scale of typical street lighting. The lights are not of a height or intensity that allows for expansive spreading or spill of light across a wide area. The light source on the dredge would move slowly throughout the lagoon as dredging progresses from one location to another and would not stay at one location for an extended period of time. The lighting at the staging areas would be stationary, but utilized primarily for intermittent staffing transfers. The nighttime lighting would only be necessary during dredging activities that require 24-hour operations (10 months in Phase 1, 7 months in Phase 2, and 7 months in Phase 3). For these reasons, **the temporary light and glare impact would not be substantially adverse and would be less than significant (Criterion C).**

Construction activities associated with the new inlet and Coast Highway 101 bridge would be clearly visible to patrons of the State Beach (Key View 2) and drivers along Coast Highway 101 (Key View 3). These viewers would see a change in the roadway as a new bridge deck is constructed on one side and motorists continue on the other side. This is not uncommon in southern California. For example, improvements are currently ongoing to the Torrey Pines bridge near Del Mar, also directly at the beach and visible to drivers and beachgoers. Drivers would be proceeding at a fairly rapid speed and **this impact to motorists would be less than significant and not substantially adverse in the short term or long term (Criteria A and B).**

Construction of the new inlet and CBFs on either side would be highly visible and a contrast to the current beach character. The CBFs would consist of two relatively short and low rock features along the outer reach of the tidal inlet channel. Rock sizes may consist of 3- to 5-ton stones that are several feet in diameter, nested together to increase the structural integrity of the structure. The platform of the CBFs attached to the bridge abutments would extend seaward approximately 230 feet. The CBFs are proposed to be approximately 100 feet wide and extended laterally along the highway bridge approach for a distance of 230 feet. With this design, the CBFs would be visible above the beach profile in winter, and then mostly buried in summer. Figure 2-7 shows faux finish that would be applied to the visible CBF to mimic natural material. As shown, it appears similar in color to the adjacent sandy material with a rough surface to reduce the artificial appearance (PDF-487). Regardless, the CBFs would introduce a built, linear feature perpendicular to Coast Highway 101 extending several hundred feet toward the ocean. Sometimes it could appear as a berm and sometimes it could be mostly buried. The contrast

would be strong for some beach users, and although efforts would be made to soften the appearance via naturalized finish and partial to full burial of the feature (depending on the season), the contrast would remain substantial. **Construction of the new inlet and CBF would result in substantial adverse and significant temporary (during construction) and long-term visual impacts (Criteria A, B, and C).**

Over 5–10 years post-restoration, as vegetation in the lagoon becomes reestablished at the new elevations/grade, the visual character of the lagoon would become similar to the existing preconstruction conditions but would host a wider variety of native vegetation and lagoon habitats of visual interest. Conditions would return due to active restoration (planting plants) as well as natural recruitment. Figure 3.9-7 illustrates the post-restoration condition at Key View 1, the trail accessed at North Rios Avenue. As shown, more open water would be visible resulting in an increase in the tidal prism. The mosaic of water, mudflats, and vegetation would return. Users of the trails and Nature Center, residents looking at the lagoon, persons at the San Elijo/Kilkenny vista point and scenic drivers would experience an open, natural system similar in character to the present condition. The increased habitat diversity may be even more interesting and appealing to trail users and visitors at the Nature Center. **The long-term visual impact associated with the restored lagoon would not be substantially adverse and would be less than significant due to implementation of the restoration project (Criteria A, B, and C).**

Alternative 2A would require maintenance dredging in the lagoon at periodic intervals. A dredge would be mobilized from the dredge launch ramp near the nesting site and move throughout the sedimentation basin to remove sand. The work may require up to 5 months for completion and is anticipated to occur every 3 to 4 years. As such, this would result in periodic visual impacts due to maintenance activities. These maintenance activities would be primarily limited to the sedimentation basin area, within the central basin, which would be open water near the new NCTD railroad bridge. Additional maintenance and adaptive management activities could occur outside of that area, but would be focused in specific areas of the lagoon and would not be extensive. The dredge would appear as a modest-sized boat (approximately 20–30 feet long), moving in an open water area. The bridges and approaches for the railroad and Coast Highway 101 would be in the background, as well as vehicles and trains passing behind the boat/dredge. The contrast of this single boat in this focused area with several transportation features would be moderate. The vast majority of the lagoon would remain unaffected during maintenance. Finally, the dredge would be present approximately 10 percent of the time over a 48-month period. Overall, **this impact would be short term, not substantially adverse, and less than significant (Criteria A, B, and C).**

Alternative 2A would require the demolition and reconstruction of the Coast Highway 101 bridge at the location of the new inlet. Roadway improvements would include the new bridge

structure (with pedestrian/bicycle path) and lane modifications approaching the bridge. Coast Highway 101 is a designated Scenic Highway. The segment of Coast Highway 101 at the proposed location for a new inlet, as well as the entire roadway segment within the project study area, has been widened and improved over the years and currently has the appearance of a modern roadway. The reconstruction of the Coast Highway 101 bridge structure and associated approach lanes would not bring a new transportation feature to the area; rather, it would modify the current roadway within its existing alignment. Because the highway has been improved and widened in the past, the new bridge structure and repaved lanes would not substantially change the overall aesthetic of the area. Motorists on Coast Highway 101 would continue to experience a modern roadway driving environment with visual highlights of the Pacific Ocean to the west, and lagoon to the east. On the bridge itself, views would broaden as motorists would be slightly elevated as compared to current conditions. But the duration of the experience would be short term. Lighting on the new bridge would be similar to existing lighting on the road and would not constitute a substantial new light source. From distant views, the new bridge and resurfaced lanes would blend into the existing highway aesthetic and would not appear out of place or as a strong contrast. For these reasons, **the long-term visual impact associated with Coast Highway 101 bridge reconstruction under Alternative 2A would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

Alternative 1B

Construction of Alternative 1B would be similar to Alternative 2A; however, Alternative 1B would not construct a new bridge along Coast Highway 101 or a new inlet lined with CBFs. The construction activities for Alternative 1B would be highly visible at Key Views 1, 3, 4, 5, and 6. Viewers at Cardiff Beach (Key View 2) would not be able to see the changes to this basin nor would there be notable changes to viewers at the beach. Viewers along Manchester Avenue (Key View 7), who would have direct views of the central and east basin, would observe construction in the main channel as it is redirected west of I-5 and extended farther into the east basin. Viewers at Key View 4 (hilltop vista point at San Elijo/Kilkenny), users of the trail system (Key View 1), and the Nature Center (Key View 5) would experience a strong contrast because of the overall change and likely perceived degradation in visual character, but also because they have higher scenic expectations. Throughout the four phases of the approximate 4-year Alternative 1B schedule, construction equipment and activities would be visible at some locations within the lagoon area (i.e., construction material at staging areas, equipment operating within the lagoon basin, etc.). **The visual impacts to these sensitive viewers would be temporary, as they would only occur during project construction, but significant and substantially adverse because of the multiyear duration of construction and the extent of the lagoon modification (Criteria A and B).**

Similar to Alternative 2A, scenic drivers' overall experience of an altered lagoon aesthetic would be short term (a few minutes as they drive by) and there are other scenic elements that would remain intact, specifically, views of the Pacific Ocean. The altered portion of the view would be a relatively small area of construction equipment located in the overall context of the large lagoon area and expansive ocean views, both in the immediate viewing area. Construction activities are periodically visible within and around the lagoon due to ongoing maintenance activities that currently take place. **Thus, impacts to scenic drivers would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

The discussion of nighttime light and glare provided under Alternative 2A would also apply to Alternative 1B. **The periodic light and glare during 24-hour construction activities would not be substantially adverse and would be less than significant.**

As shown in Figure 3.9-8, the post-restoration views under Alternative 1B would be different, but would be compatible with the surrounding landscape and satisfy expectations of viewers on trails, at scenic view points, and at the Nature Center. The post-restoration views would continue to include lagoon habitats, channels and basins, and other flora and fauna associated with the lagoon and expected by lagoon viewers. Alternative 1B would modify habitat distributions in the lagoon, which could modify viewer experience as the balance of open areas, habitat types, and open water areas would be altered from existing conditions. Existing channels and areas of mudflat would be enlarged, resulting in a higher proportion of open water and unvegetated areas compared to existing conditions. While this is a modification from the existing lagoon aesthetic, it is in character with the visual environment expected of a lagoon setting and would not result in a deteriorated or highly modified viewing experience. The existing inlet and bridge along Coast Highway 101 would be the same in character and size as the existing one, as would Coast Highway 101. The retrofitting work necessary under Alternative 1B would consist mainly of work to the understructure of the bridge and would not create substantial visual changes to the bridge itself. For these reasons, **the permanent visual impacts would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

Alternative 1B would require annual inlet maintenance under Coast Highway 101 and in the channel underneath the railroad. Additional channel maintenance and adaptive management activities may occur in other focused areas of the lagoon. Inlet maintenance would be very similar to routine maintenance that currently occurs in these locations at the existing inlet, which is moderately visible to beachgoers near the inlet and drivers along Coast Highway 101. As described for Alternative 2A, other maintenance activities would generally occur via a small dredge in open water with the existing visual elements of Coast Highway 101, traffic, trains, and other infrastructure in the background. Annual maintenance is expected to take approximately 4 weeks to complete. The temporary contrast of the construction equipment in this visual setting

would be moderate and the vast majority of the lagoon would remain unaffected during maintenance. Therefore, **the impact would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

Alternative 1A

Construction of Alternative 1A would result in more minimal and fewer physical changes to the study area. This alternative would not include construction of a new bridge along Coast Highway 101 or a new inlet with CBFs. Viewers at Key Views 1, 4, and 5 would have higher degrees of visual sensitivity, as they would have direct views of the project study area. Users of the trail system (Key View 1), viewers on the vista point in Encinitas (Key View 4), and visitors at the Nature Center (Key View 5) would experience a moderate contrast with construction equipment in the lagoon but construction activities would be focused on select channels with less broad grading and habitat conversion. Viewers would likely perceive a temporary degradation in visual character during this time. Viewers at Cardiff Beach (Key View 2) would not be able to see the changes to this basin due to the elevation of the roadway. The retrofitting work necessary under Alternative 1A would consist mainly of work to the understructure of the Coast Highway 101 bridge and would not create substantial visual changes to the bridge itself. Viewers looking at the channel mouth and bridge understructure would be limited to beach visitors at that exact location. The anticipated construction schedule for Alternative 1A would be less than two years, substantially shorter than the other alternatives. Because of the reduced area of activity where construction equipment and operations would be temporarily visible and the reduced timeframe that construction would occur, the **overall, temporary visual impacts would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

Similar to that described for Alternative 2A, viewers along Manchester (Key View 7) would have low visual sensitivity due to the intermittent foreground views and short duration of the views. **Impacts to scenic drivers (Key View 3 and Key View 6) would not be substantially adverse and would be less than significant (Criteria A, B, and C),** as their overall experience would be extremely short term (a few minutes as they drive by), and other key scenic elements would remain intact.

The discussion of nighttime light and glare provided under Alternative 2A would also apply to Alternative 1A. **The periodic light and glare during 24-hour construction activities would not be substantially adverse and would be less than significant (Criterion D).**

Post-restoration views under Alternative 1A would be similar to existing views, but with enlarged channels presenting more open water to the viewer. The vegetation mosaic would vary, but the overall habitat types would remain. For this reason, **the long-term visual impact to**

viewer groups at the lagoon would not be substantially adverse and would be less than significant (Criteria A, B, and C).

Alternative 1A would require annual maintenance under Coast Highway 101 and in the channel underneath the railroad. Inlet maintenance consists of using earthmoving equipment to clear the existing tidal inlet channel from Coast Highway 101 to approximately the location of Kai's Restaurant, upstream to near the location of the first channel bend (west of the railroad line). This is not a substantial change from current inlet maintenance performed in the existing tidal inlet channel. There would be periodic maintenance activities visible during the calendar year, occurring approximately once each year and lasting approximately 2 weeks in duration. Other maintenance and focused areas of adaptive management activities would also occur over time. However, **impacts would be short term and in a focused area of the lagoon; therefore, impacts would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in modifications to the lagoon or Coast Highway 101/inlet and no change would occur to existing conditions or resources. Under this alternative, certain areas of the lagoon could continue to convert to salt marsh. While this may reduce habitat diversity and present a mono-typical form, the contrast would be weak relative to adjacent wetlands. **Therefore, there would be no impact to visual resources since the project area would remain unchanged from its existing condition. Impacts would not be substantially adverse and would remain less than significant (Criteria A, B, C, and D).**

Materials Disposal/Reuse Sites

The visual impact analysis for the materials disposal/reuse sites addresses the potential for the various alternatives to impact existing visual conditions at the materials placement sites for adjacent viewers (beach users and viewers from vista points on the cliffs/bluffs above). Information is largely referenced from the 2012 RBSP EA/EIR (SANDAG 2012). Depending on the quality of materials to be exported, a number of different disposal and/or reuse scenarios are proposed. These methods include offshore disposal, offshore stockpiling, nearshore (inside littoral cell), onshore (beach placement), and onshore fill.

The visual changes associated with the materials disposal/reuse component, including construction equipment and pipelines on the beach would only occur during construction activities, resulting in temporary visual impacts. Once onshore material placement is completed, the placement material would be similar to the existing beach and any discoloration of the

sediment would be short term (typically 1 to 4 years) and not a substantial degradation of the overall sandy beach appearance. The placement material would be washed by waves, exposed to the sun, and eventually mixed with the existing sand to minimize potential contrast. This nourishment material is a beneficial enhancement of the beach because sand is preferable to cobble both visually and recreationally.

Some construction activities would be restricted to daytime hours, but some activities require operation 24 hours a day to remain efficient (e.g., dredging and subsequent placement/disposal activities). Additionally, activities like materials delivery may be scheduled for nighttime hours. Lights may be necessary at the beach sites to allow for 24-hour sand placement activities. Construction lighting would consist of lights on poles, similar to street lights, to illuminate the immediate work area when the dredge is discharging. Lights would be downshielded to minimize spillover into areas beyond the work zone and directed toward the ocean and away from any nearby residential areas (PDF-7). Another light source may also include the headlights of construction equipment, such as bulldozers working to spread the material on the beach area. These lights would be only in the immediate work area in front of the equipment and would be focused toward ground level, similar to a car headlight. The lighting would only be necessary during onshore material placement, which would require fewer than 60 days at an individual site. Some temporary lighting may also be required at booster pump locations during service and short-term checking by operations personnel. Because the lights would not create a substantial source of light and many material placement sites are near areas that include street lighting, residential lighting, and lights associated with vehicle traffic, **the temporary use of night lighting for construction activities would not be substantially adverse and would be less than significant (Criterion D).**

Alternative 2A

Alternative 2A would involve beneficial reuse of material exported from the dredging site. Dredging and transport of material to various sand placement sites for reuse would take approximately 10 months, but not more than 60 days at any beach placement site. Construction activities could result in temporary visual changes to viewers in proximity to these sites or the transport routes to access these sites as described in the analysis below for each material placement scenario.

Offshore Stockpiling

Offshore stockpiling would alter existing views along the materials disposal/reuse site because of proposed equipment that would be utilized. A single pipeline would traverse the beach into the ocean waves. It would then be largely invisible on the sea bottom. The onshore portion of the

pipeline would have up to two booster pumps located at intervals along the pipeline to keep the materials moving at an appropriate speed to avoid settling. The booster pumps appear industrial in nature, looking like a large engine that straddles the pipeline, and would be fenced with chain-link if located on an unsecured beach area. While they are out of character with the beach and ocean setting, they are visually consistent with the pipeline and other construction-related equipment that would be apparent during the construction period. There would be offshore equipment (e.g., offshore mooring, monobuoy, and barge) that would appear visible on the horizon much like many other boats (e.g., fishing, pleasure, etc.) that are active along the coast. The offshore equipment would not be highly evident or dominate the landscape. Furthermore, this would not be a permanent or significant visual impact. **The short-term nature of offshore stockpiling activities and the limited visibility of the pipeline to sensitive viewers on the beach or bluffs above would result in a less than significant impact that is not substantially adverse (Criteria A, B, and C).**

Nearshore (Inside Littoral Cell)

Nearshore placement of beach-quality material under Alternative 2A may occur off of Cardiff State Beach, just outside of the surf zone. Beachgoers would have direct views of the temporary pipe that would be placed from the lagoon mouth into the surf zone. The pipeline would then traverse the ocean floor to the proposed placement location; thus, it would not be visible by viewers. Similar to the offshore stockpiling description, booster pumps would be necessary along the onshore pipeline. **The short-term nature of offshore stockpiling activities and the limited visibility of the pipeline to beachgoers would result in a less than significant impact that is not substantially adverse (Criteria A, B, and C).**

Onshore (Beach Placement)

The potential beach placement locations have a variety of sensitive viewer, dependent upon individual location as detailed in Table 3.9-2. All locations have beachgoers that could view the construction equipment and activities, and most locations also have residential areas with views of the beach area. Each beach has a unique set of viewers with a range of viewer sensitivities, such as Torrey Pines, which has recreational viewers from the state reserve area; Moonlight, which has a nearby park area; or Cardiff, which includes nearby seaside restaurants known for their views of the ocean. However, all of these locations have been recipients of beach nourishment in the past, as part of the 2001 RBSP or 2012 RBSP, or other material placement programs. The visual occurrence of construction equipment on these beaches is not highly uncommon to these locations or associated viewers.

Onshore material placement could occur via pipeline delivery on the back beach (Cardiff), or via barge and monobuoy (Section 2.10.2). Similar to the offshore stockpiling description, booster pumps would be necessary along onshore pipelines. Construction equipment (i.e., pipeline, barge, monobuoy, training dike, etc.) would be temporarily visible to various beachgoers and viewers on the bluffs/cliff above. The expected time for sand placement on specific sites is between 2 to 4 weeks, depending on the amount of sand being placed and the rate at which sand is discharged onto the beach, but not more than 60 days. During the 2001 and 2012 RBSPs, sand was periodically placed next to the discharge pipe to allow lifeguard vehicles and pedestrians to cross over the pipe. This would also occur with the proposed project so that the visible linear extent of the pipeline is minimized.

Onshore material placement would temporarily degrade the existing visual character or quality of the site during dredging activities, but the short-term nature of the activities and the visual memory of past similar activities would result in not substantially adverse and less than significant impacts to beachgoers (Criteria A, B, and C).

Alternative 1B

Offshore Stockpiling, Nearshore (Inside Littoral Cell), Onshore (Beach Placement)

Materials disposal/reuse under Alternative 1B would involve similar construction activities and material placement options as those described for Alternative 2A, but with less volume of materials at nearshore placement and onshore fill (see Table 2-21). Because of the lesser volume of material being dredged from the lagoon under Alternative 1B as compared to Alternative 2A, the construction period would be somewhat shorter; the temporary visual change due to construction activities would be slightly less than that described for Alternative 2A. However, the equipment necessary to perform the dredging and material placement would be almost identical. Thus, analysis discussed above for Alternative 2A is applicable to Alternative 1B and the **temporary visual impacts resulting from material placement activities would be less than significant and not substantially adverse (Criteria A, B, and C).**

Alternative 1A

Offshore Disposal Only

Under this alternative, material would be conveyed via pipeline and barge to LA-5. Short-term impacts would be identical to Alternative 2A for the pipeline and booster pumps conveying material from the dredge to an offshore barge. Offshore equipment (e.g., offshore mooring, monobuoy, and barge) would appear visible on the horizon much like many other boats (e.g., fishing, pleasure, etc.) that are active along the coast. The actual disposal of the material

from the barge to the ocean floor would be so far offshore that the barge would not be visible to viewers on the beach or people on the bluffs. **The short-term nature of offshore disposal activities and the limited visibility of the pipeline to beachgoers would result in less than significant and not substantially adverse visual impacts (Criteria A, B, and C).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in material export. Therefore, **there is no visual impact since the existing condition would remain unchanged. Impacts would not be substantially adverse and would remain less than significant (Criteria A, B, C, and D).**

3.9.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Mitigation measure Visual-1 would be required for implementation of Alternative 2A and Alternative 1B to address the temporary but significant change in the visual quality and character of the lagoon for key viewers during construction (Criteria A and B).

Visual-1 Temporary screening would be placed around construction areas that are secured with a chain-link fence (such as booster pumps, staging areas, etc., as shown in Figure 2-15) to provide visual screening of the equipment located within the secured area. Screening could be brown or green mesh or other similar screening material attached to the fencing that would visually hide or obscure the interior of the fenced areas. The screening would extend as high as the chain-link fence, which would range from approximately 6 to 10 feet, depending on the area being secured.

While the visual screening of fenced areas as proposed in mitigation measure Visual-1 may partially reduce some visual impacts, this measure would not fully mitigate the visual impact of the construction activities occurring throughout the lagoon area. The screening may reduce some of the adverse visual effects of construction-related equipment and materials within small fenced areas, but this would be a localized. This focused reduction of a portion of the entire visual impact would not be of the magnitude to reduce the overall visual impact of the lagoon under construction. To perform the lagoon restoration as proposed in Alternative 2A and Alternative 1B, construction activities must occur throughout the lagoon area and the proposed timeframe is necessary for all actions to occur (including nighttime construction with lights). It is not feasible to achieve the desired restoration goals of these two alternatives in a shorter or less construction-intensive manner. Thus, there is no additional mitigation to fully reduce temporary adverse and significant impacts as a result of construction activities under Alternative 2A and Alternative 1B.

Long-term visual impacts associated with the inlet and CBFs under Alternative 2A are considered adverse and significant, and unmitigable. The design of the CBFs allows for the features to be naturally buried to blend in with the beach area and have the lowest profile possible. Additionally, as described in PDF-48, the CBFs would be treated with faux finishes to provide a more “naturalized” appearance to look like natural bedrock, sandstone, or other sedimentary features. No additional aesthetic treatments, design options, or other feasible mitigation measures are available.

Materials Disposal/Reuse

Potential impacts would be less than significant and no mitigation measures are proposed.

3.9.5 LEVEL OF IMPACT AFTER MITIGATION

Lagoon Restoration

CEQA: Mitigation measure Visual-1 would partially reduce the temporary visual impact that would result from construction activities throughout the lagoon; however, this measure would not fully mitigate the overall temporary visual impact.

The temporary construction impacts associated with Alternative 2A and Alternative 1B would be eliminated by the completion of the project and the removal of construction equipment and associated construction features such as the return of staging areas to their original condition. Additionally, the flora associated with the lagoon’s visual environment would be restored by post-restoration planting and recovery. These impacts would be reduced to less than significant by the passage of time, not a mitigation measure.

The CBFs are designed to maximize burial and minimize the exposed hardscape, along with faux finishes to provide a more “naturalized” appearance. However, the introduction of two linear, perpendicular elements of substantial size to this cobbly/sand beach cannot be fully mitigated while still allowing the feature to perform its intended function of minimizing cobble migration into the lagoon. Permanent impacts associated with the inlet/CBF under Alternative 2A would remain significant and unavoidable.

NEPA: Mitigation measure Visual-1 would partially reduce the temporary adverse visual effects that would result from construction activities throughout the lagoon. While visual impacts associated with project construction of Alternative 2A and Alternative 1B within the lagoon would cease over time with the end of construction and the restoration/recovery of lagoon

habitats, the temporary visual effects are considered adverse due to the length of time that the visual condition of the lagoon would be degraded as well as the sensitivity of viewers.

The visual change associated with the inlet/CBFs required under Alternative 2A is considered adverse, as the new feature would introduce a permanent, visually contrasting linear element that does not fully blend with the natural visual environment of the beach and ocean setting.

Materials Disposal/Reuse

CEQA: Due to the short-term duration of construction equipment and limited visibility to sensitive viewers during material placement, potential impacts would be less than significant and no mitigation measures are proposed.

NEPA: Due to the short-term duration of construction equipment and limited visibility to sensitive viewers during material placement, the temporary degradation of the visual environment is not considered adverse.

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3.10 TRAFFIC, ACCESS, AND CIRCULATION

Implementation of the project would require the use of the local circulation system for construction activities and operations. This traffic analysis considers the construction impacts to the street system due to the construction-related activities. Operational impacts are not considered in this analysis as there would be no resulting project-related traffic once restoration activities are completed. This section is based on the traffic analysis presented in Construction Impact Analysis, San Elijo Restoration Project (LLG 2014), included as Appendix J. Technical details of the traffic analysis and methodology are included in that report.

Given the 2013 approval of California Senate Bill No. 743, changes are pending regarding traffic circulation analysis required by CEQA. It is not yet clear what criteria will be used for future traffic circulation analysis. Because of these preestablished criteria, and the fact that the lagoon restoration will not induce traffic beyond short-term construction impacts, no changes to this analysis will be warranted by the new legislation and the resultant changes to the CEQA Guidelines.

3.10.1 AFFECTED ENVIRONMENT

Effective evaluation of the traffic impacts associated with the project requires an understanding of the existing transportation system within the project study area. This section describes the existing circulation system and traffic conditions of the project study area. Focused discussions on the specific conditions at San Elijo Lagoon and materials disposal/reuse sites are provided under separate headings.

San Elijo Lagoon Study Area

Study Area

The proposed restoration activities within the San Elijo Lagoon study area would occur in-and-around San Elijo Lagoon, generally east and west of I-5, south of Manchester Avenue, and north of Lomas Santa Fe Drive. I-5, Coast Highway 101, Chesterfield Drive, San Elijo Avenue, Manchester Avenue, Lomas Santa Fe Drive, and North Rios Avenue were included in the analysis. The following eight associated intersections were also included in the project study area analysis.

- Coast Highway 101/Chesterfield Drive
- Chesterfield Drive/San Elijo Avenue
- I-5 Southbound (SB) Ramps/Manchester Avenue

- I-5 Northbound (NB) Ramps/Manchester Avenue
- Lomas Santa Fe Drive/Coast Highway 101
- Lomas Santa Fe Drive/N. Rios Avenue
- I-5 SB Ramps/Lomas Santa Fe Drive
- I-5 NB Ramps/Lomas Santa Fe Drive

Existing Circulation System

The following is a description of the existing street network in the study area. Peak hours discussed in this section refer to the peak commute hours for adjacent street traffic, which occur weekdays between 7 to 9 a.m. and 4 to 6 p.m.

Interstate 5

I-5 is classified as a Freeway and built as an eight-lane divided roadway in the vicinity of the project area. The nearest interchanges to the project area are at Lomas Santa Fe Drive, Manchester Avenue, and Birmingham Drive. On-ramps at these interchanges are metered with the exception of the northbound on-ramp at the Birmingham Drive Interchange.

Coast Highway 101

Coast Highway 101 is classified as a Scenic Highway within the City of Solana Beach Circulation Element and as a Four-Lane Major road within the City of Encinitas Circulation Plan in the vicinity of the study area. From Lomas Santa Fe Drive north to just north of West Cliff Street, Coast Highway 101 is currently built as a three-lane roadway (two travel lanes northbound and one southbound) with a raised center median. This portion of the roadway is part of the recently implemented Coast Highway 101 Westside Improvement Project, which extends from Dahlia Drive to West Cliff Street. This project has facilitated the provision of pedestrian amenities, diagonal parking, a landscaped median, and bicycle “sharrows” among other improvements. A Class II bike lane is provided on the east side of the roadway. The posted speed limit has been reduced to 35 mph in this area.

North of West Cliff Street to Ocean Street, Coast Highway 101 is built as a four-lane roadway divided by a landscaped raised median. North of Ocean Street to Chesterfield Drive, Coast Highway 101 is built as a four-lane undivided roadway with posted speed limits between 45 mph and 50 mph. Class II bike lanes and bus stops are provided along both sides of the roadway. Curbside parking is intermittently allowed on the west side of the roadway. There are paved shoulders but no sidewalks are provided along this stretch of Coast Highway 101. Traffic is controlled by signals at some driveways, providing access to beach parking or businesses located

along the highway; otherwise, spacing between signalized intersections is large. The Coast Highway 101 bridge is also a four-lane facility.

Chesterfield Drive

Chesterfield Drive is an unclassified local road, currently built as a two-lane undivided roadway extending east from Coast Highway 101 near the coast. Curbside parking is generally available but very restricted on some narrower blocks. The posted speed limit is 25 mph and sidewalks are generally available on at least one side of the roadway, west of Montgomery Avenue. There is an at-grade crossing of Chesterfield Drive by the San Diego Northern Railway (SDNR), managed by NCTD. During peak hours, three or fewer crossings occur, requiring interruption of standard signal timing for the intersections adjacent the crossing on Chesterfield Drive.

San Elijo Avenue

San Elijo Avenue is classified as a Local Collector road and is currently built as a two-lane undivided roadway with a speed limit of 25 mph. In the vicinity of the project area, curbside parking is provided near Chesterfield Drive but is otherwise generally prohibited. Sidewalks are provided on the east side of the roadway, north of Dublin Drive.

Manchester Avenue

Manchester Avenue from El Camino Real west to I-5 is classified as a Prime Arterial road in the City of Encinitas Circulation Plan. West of I-5, Manchester Avenue is classified as a Local Collector road in the City of Encinitas Circulation Plan. The segment of Manchester Avenue between El Camino Real and I-5 is currently constructed as a four-lane undivided roadway. The posted speed limit is 50 mph and a Class II bikeway is provided on either side of the roadway. Parking along the roadway is prohibited. West of I-5 to San Elijo Avenue, Manchester Avenue is currently constructed as a two-lane undivided roadway with a posted speed limit of 40 mph. Curbside parking is generally not provided and there is an intermittent sidewalk along the north side of the roadway. Beyond San Elijo Avenue, Manchester Avenue becomes a local residential road with a 25 mph speed limit and curbside parking. Manchester Avenue has a 7-ton truck weight limit beginning just west of the I-5 southbound ramps.

Lomas Santa Fe Drive

Lomas Santa Fe Drive is classified as a Major Arterial road on the City of Solana Beach Circulation Element. It extends from Coast Highway 101 near the coast eastward to the Solana Beach city limits. It provides four undivided travel lanes with an intermittent two-way left-turn

lane from Coast Highway 101 to where it forms a fully signalized diamond interchange at I-5. The speed limit is posted at 35 mph and Class II bike lanes are provided along both sides of the roadway within the study area.

North Rios Avenue

North Rios Avenue is classified as a Local Road in the City of Solana Beach Circulation Plan and runs from the edge of San Elijo Lagoon in the north to Lomas Santa Fe Drive in the south. North Rios Avenue is currently built as a two-lane undivided roadway generally serving residences, the Solana Beach School District, and some commercial uses near Lomas Santa Fe Drive. The posted speed limit is 25 mph. Curbside parking is provided intermittently along either side of the roadway. Sidewalks are generally not provided except for north of Patty Hill Drive and immediately north of Lomas Santa Fe Drive.

Existing Level of Service

Level of service (LOS) is the term used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis with designations ranging from A through F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

Weekday AM/PM peak hour intersection turning movement counts were conducted at eight study area intersections in October 2012 while schools were in session. No major events (e.g., San Diego County Fair or horse racing) were occurring at the Del Mar Fairgrounds at this time. Bidirectional 24-hour segment counts were also conducted in October at 10 street segments in the project study area. Average daily traffic (ADT) volumes and LOS are shown in Table 3.10-1. Existing intersection operations are shown in Table 3.10-2.

As shown in Table 3.10-1, the study area street segments currently operate at LOS D or better with the following exception:

- Lomas Santa Fe Drive, Solana Hills Drive to I-5 SB Ramps – LOS E

As shown in Table 3.10-2, study area intersections currently operate at LOS D or better.

**Table 3.10-1
Existing Street Segment Traffic Volumes and LOS**

Street Segment	Jurisdiction	ADT	LOS
Coast Highway 101			
North of Chesterfield Drive	Encinitas	16,550	A
South of Chesterfield Drive	Encinitas	20,130	A
North of Lomas Santa Fe Drive	Solana Beach	17,560	C
Chesterfield Drive			
East of Coast Highway 101	Encinitas	17,950	A
San Elijo Avenue			
South of Chesterfield Drive	Encinitas	670	A
Manchester Avenue			
West of I-5	Encinitas	7,100	A
East of I-5	Encinitas	28,240	D
North Rios Avenue			
North of Lomas Santa Fe Drive	Solana Beach	2,080	A
Lomas Santa Fe Drive			
East of Coast Highway 101	Solana Beach	19,550	B
Hilmen Drive to Glencrest Drive/Stevens Avenue	Solana Beach	23,010	C
Solana Hills Drive to I-5 SB Ramps	Solana Beach	38,130	E

**Table 3.10-2
Existing Intersection Operations**

Intersection	Control Type	Peak Hour	Existing	
			Delay ¹	LOS
Chesterfield Drive/Coast Highway 101	Signal	AM	20.2	C
		PM	27.2	C
Chesterfield Drive/San Elijo Avenue	Signal	AM	23.3	C
		PM	21.7	C
Manchester Avenue/I-5 Southbound Ramps	All-Way Stop Controlled	AM	17.5	C
		PM	12.4	B
Manchester Avenue/I-5 Northbound Ramps	Signal	AM	18.5	B
		PM	23.6	C
Lomas Santa Fe Drive/Coast Highway 101	Signal	AM	28.6	C
		PM	33.4	C
Lomas Santa Fe Drive/Rios Avenue	Signal	AM	10.8	B
		PM	11.8	B
Lomas Santa Fe Drive/I-5 Southbound Ramps	Signal	AM	20.0	C
		PM	19.6	B
Lomas Santa Fe Drive/I-5 Northbound Ramps	Signal	AM	49.2	D
		PM	29.0	C

¹ Average delay expressed in seconds per vehicle

Materials Disposal Study Area

This existing conditions section for traffic at the potential materials disposal study areas addresses onshore placement site access. As described in Section 2.10.2, the majority of work necessary for materials placement on onshore sites occurs offshore and minimal land transportation is required. All offshore and nearshore disposal/reuse material placement would be accomplished via ocean barge and pipeline, and no land-based traffic would result; thus, offshore and nearshore scenarios are not further considered in this traffic analysis. Information specific to the onshore materials disposal/reuse study area discussion is from the 2012 RBSP EA/EIR (SANDAG 2011).

Regional access to disposal/reuse sites is provided via I-5. West of I-5, access is also provided via Coast Highway 101, which extends from Oceanside south to Solana Beach. North Torrey Pines Road provides direct access to the Torrey Pines site. The principal access routes from I-5 to each of the onshore disposal sites are identified in Table 3.10-3.

**Table 3.10-3
Principal Access Routes**

Receiver Site	Principal Access Route
Leucadia	La Costa Avenue, Leucadia Boulevard
Moonlight Beach	Encinitas Boulevard
Cardiff	Birmingham Drive
Solana Beach	Lomas Santa Fe Drive, Via de la Valle
Torrey Pines	Carmel Valley Road, Genesee Avenue

Existing traffic on beach access routes is often heavy, as most of the routes serve commercial, motel or camping, and residential uses as well as area beaches. Traffic is most congested on warm weekends, when residents from throughout San Diego County and adjacent areas use the beaches. During these peak use periods, beach parking areas often are filled to capacity.

3.10.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to traffic, access, and circulation would occur under CEQA if implementation of the proposed project would:

- A. Conflict with an applicable congestion management program, including, but not limited to, LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

- B. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- C. Result in inadequate emergency access;
- D. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities; or
- E. Result in a long-term impact to access routes, local streets, or parking areas in the vicinity of the project area.

The CEQA thresholds of significance for traffic, access, and circulation were derived from a combination of thresholds listed in Appendix G of the CEQA Guidelines and thresholds used in the the 2012 RBSP EIR document. The additional threshold addressing access and parking was established to capture impacts associated with coastal access and parking that could result from the project. In addition, the cities of Encinitas and Solana Beach use the published, regional San Diego Traffic Engineers' Council (SANTEC) criteria for determining the significance of a project's traffic impacts. According to these criteria, a project is considered to have a significant impact if the new project traffic has decreased the operations of surrounding roadways by a defined threshold. The defined thresholds for roadway segments and intersections are defined in Table 3.10-4. If the project exceeds the thresholds in Table 3.10-4, then the project may be considered to have a significant project impact. These thresholds are also considered applicable to Caltrans facilities.

**Table 3.10-4
Traffic Impact Significance Thresholds**

Level of Service with Project ¹	Allowable Increase due to Project Impacts ²			
	Freeways V/C	Roadway Segments V/C	Intersections Delay (seconds)	Ramp Metering Delay (minutes)
D ³ , E, & F (or ramp meter delays above 15 minutes)	0.01	0.02	2	2

¹ All LOS measurements are based on Highway Capacity Manual procedures for peak-hour conditions. However, V/C ratios for roadway segments may be estimated on an ADT/24-hour traffic volume basis (using this table or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

² If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets.

³ The City of Encinitas accepts LOS D operations, regardless of project increase in V/C, delay, etc., whereas the City of Solana Beach considers LOS D to have the same allowable increases as LOS E/LOS F. The analysis tables define the jurisdiction of each location.

V/C = volume to capacity ratio

Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters

3.10.3 ENVIRONMENTAL CONSEQUENCES

This section discusses the environmental consequences, or impacts, associated with the proposed project on traffic operations and circulation patterns in the study area. Potential adverse, significant, or beneficial direct and indirect impacts are identified as appropriate.

The regulatory setting related to traffic and circulation is generally set forth through the traffic criteria adopted by local jurisdictions to define acceptable levels of operation for existing and future traffic conditions on their roadways. This information is provided above in Section 3.10.2 for the cities of Encinitas and Solana Beach. Appendix C contains applicable regulatory requirements specific to individual topic areas.

Lagoon Restoration

This section analyzes the potential impacts associated with short-term construction activity of lagoon restoration. Phase 2 of Alternative 2A was determined to have the greatest potential for trip generation due to vegetation clearing and new bridge construction and reflects the most conservative estimation for traffic. It is therefore considered the “project” for the purposes of the traffic analysis. Alternative 1B and Alternative 1A would each generate less traffic since there would be no new bridge construction associated with those alternatives (and bridge retrofit work would generate fewer trips over a shorter duration) and vegetation clearing would be similar or less than that identified for Alternative 2A. As detailed in Section 2.10.1, Phase 2 of Alternative 2A would include the majority of the material being hauled off-site during vegetation clearing, dredging of the lagoon itself (employee trips), and also bridge construction and de facto traffic rerouting (Alternative 2A). Modification of the concrete CDFW dike would also occur during this phase, but would not result in truck trips since material would be reused to create the proposed transitional area (Alternative 2A and Alternative 1B) or only minor excavation would be required to enhance flow through the dike (Alternative 1A). Proposed flooding to support construction activities would not extend to or affect public roadways or general traffic operations. The analysis below is separated into trip generation and road closure discussions to distinguish between the impacts associated with each.

Trip Generation

The following are construction characteristics of the project alternatives that would generate traffic in the project study area. Please see the Traffic Analysis Report in Appendix J for full calculation details.

Vegetation Clearing

While this activity would occur in advance of dredging for all four phases of the project, the majority of material (300,000 cy) is assumed to be removed during Phase 2, using 12-cy capacity dump trucks. The majority of these trips would be limited to staging area and access site 7, identified in Figure 2-15, which is located adjacent to the freeway and would avoid the need for trucks to travel through existing neighborhoods. Removal of the CDFW dike would not create truck trips on the public road network. The amount of time needed for Phase 2 vegetation removal is approximately 172 working days with seven dump trucks available each day to remove vegetation and the CDFW dike from the site. Assuming 172 working days to remove 300,000 cy of material using seven dump trucks each with a 12-cy capacity, the average number of one-way trips per day calculates to 21 one-way truck trips per working day.

Each truck trip would be multiplied by a factor of two to represent the inbound loading trip and the outbound haul trip (two-way trip). A Passenger Car Equivalence (PCE) Factor of 3.0 would also be applied to the trip to represent the fact that heavy vehicles have an additional effect on traffic flow as compared to passenger cars and light trucks due to their diminished handling characteristics. During hauling operations, contractors typically follow a 10-hour workday; therefore, the anticipated daily haul trips would be 126 PCE ADT with approximately 14 AM peak hour (7 inbound/7 outbound) and 14 PM peak hour (7 inbound/7 outbound) PCE trips.

Temporary Dike Construction and Removal

The construction and removal of temporary dikes would occur during all four phases of the project. Approximately 50,000 cy of material would be needed for this activity. The material is proposed to be generated from the lagoon by either excavation along the utility road and/or proposed dike footprint, or by obtaining the material from Caltrans as surplus from the I-5 North Coast Corridor Project bridge replacement. No off-site hauling of material is anticipated with this activity. Therefore, no truck trips would occur and the total number of workers expected on any given day was assumed to account for dike-related activities.

Dredging

Dredging of the lagoon would occur over all four phases of the project. The dredged material would be exported from the site via pipeline or reused within the project footprint, so no truck trips would occur and the total number of workers expected on any given day was assumed to account for dredging-related activities. Ocean-based traffic associated with materials placement and disposal, including barge trips and monobuoy location, is addressed under Land Use/Recreation and Hazardous Materials and Public Safety. These sections also discuss project

design features identified in Chapter 2 that are intended to minimize conflicts with existing marine traffic, such as coordination with USCG and issuance of a Notice to Mariners (see PDF-59 through PDF-62).

Worker Trips

The total number of workers associated with construction-related activities expected to be on-site on any given day during the 36-month construction period is up to 40 workers based on proposed phasing and type of activities. Typical work shifts during grading and dredging are expected to be 8-hours per day, which differs slightly from shift durations that typically occur during hauling operations. One shift is anticipated to occur during construction activities limited to daytime hours (e.g., access road improvements), while multiple shifts would occur during 24-hour dredging operations. Dredging operations require few personnel and shift changes generally occur at off-peak hours. Forty workers per day working 8-hour shifts represents a conservative estimate of worker trips. The total number of daily trips generated by workers would be 80 ADT. The peak hour volumes (AM and PM peaks) were estimated assuming that workers arrive on-site at 7:00 a.m., prior to the start of the AM peak period (between 7:00 and 9:00 a.m.) based on a typical construction workday. It was conservatively assumed that the total worker force would leave during the PM peak period (between 4:00 and 6:00 p.m.), although it is likely that most workers would leave the site prior to this time at the end of the work shift (closer to 3:30 p.m., based on an 8-hour workday). Therefore, no worker trips would be generated during the AM peak period and 40 worker trips would be generated during the PM peak period (0 inbound/40 outbound).

Miscellaneous Trips

It is also expected that assorted, miscellaneous trips would occur, such as visits by inspectors and engineers, deliveries of materials not discussed already, etc. Some truck trips were also accounted for in miscellaneous trips.

Employee Parking

Parking for employees would be provided, generally in public parking lots adjacent to Coast Highway 101 and Manchester Avenue (Figure 2-15). During peak beach attendance, dedicated lots would be identified for contractor parking (PDF-69). A shuttle would likely be necessary for some of the more distant lots.

Bridge Reconstruction (Alternative 2A Only)

The project would demolish and replace Coast Highway 101 with a bridge over the new mouth of the lagoon (Alternative 2A only). Based on construction estimates, 240 two-way concrete

delivery truck trips, 200 two-way other delivery-type truck trips, 600 two-way base and asphalt concrete delivery truck trips, and 3,000 two-way dump truck trips would be required over the course of the 18-month bridge construction period. It is expected that concrete delivery trucks would occur over 40 days throughout the entire bridge construction period, other delivery truck trips would occur regularly throughout the entire 18 months, base and asphalt concrete delivery truck trips would occur over 6 months (3 months per stage) during construction of the new roadway, and dump truck trips would occur over 2 months (1 month per stage) to excavate for the bridge and remove the existing roadway.

Since bridge construction is expected to begin during the first phase of project construction, traffic from bridge construction that would overlap with Phase 2 of the project was included in the trip generation calculations. For concrete and other/various truck trips, as well as dump truck trips, the average number of truck trips per day was calculated since these trips are expected to occur throughout the 18-month period. For base and asphalt truck trips, the number of trips expected during the 3 months of the second stage was included in Phase 2 to provide a conservative analysis.

Consistent with the vegetation removal phase, the hourly average of overall daily truck trips was utilized to determine the AM and PM peak hour trips. This average was divided in two to represent the inbound and outbound average during the hour. Calculations determined a total of 260 two-way trips per day with an average of 34 trips per hour (17 inbound/17 outbound per hour).

The bridge would remain in service throughout the demolition and replacement period, with two-way traffic flow maintained at all times (PDF-43). As one side of the current four-lane bridge is closed and rebuilt, two-way traffic would be rerouted to the other side, with lane drops and detours across the median necessary on Coast Highway 101 on either side of the bridge. There are no plans to provide formal detour routes, since two-way traffic would continue to be maintained. However, it is expected that some through traffic on Coast Highway 101 would divert to I-5, with the final opportunity to do so via Manchester Avenue in the north or Lomas Santa Fe Drive in the south.

Operations along Coast Highway 101 south of Chesterfield Drive and on Lomas Santa Fe Drive from Solana Hills Drive to I-5 would be affected by the bridge lane closure and would experience degradation in LOS exceeding the allowable thresholds during bridge construction activities. **This degradation would be considered a temporary direct significant and substantially adverse impact (Criterion A).**

Bridge Retrofitting (Alternatives 1B and 1A Only)

Alternative 1B and Alternative 1A would not necessitate the replacement of the Coast Highway 101 bridge as proposed in Alternative 2A as there is no new inlet; however, Alternative 1B and Alternative 1A would involve retrofitting the existing bridge to address existing seismic deficiencies. Similar to Alternative 2A, the existing bridge would remain in service throughout the retrofitting activities, with two-way traffic flow maintained at all times (PDF-43), with one side of the bridge closed and traffic rerouted to the other side while work was completed. While the duration and timing of the retrofitting would be less than the complete bridge construction, the necessary lane closures are similar and thus would result in similar traffic impacts and trip redistribution as analyzed for Alternative 2A.

Total Trip Generation

Project-generated ADT was calculated by taking worker and truck trips for each component of Phase 2 of the project (Alternative 2A and Alternative 1B) as described above (vegetation removal, bridge construction, worker trips, and miscellaneous trips) and combining them for a total. The total maximum ADT associated with Phase 2 would be 512. This includes 35 in and 35 out trips during the AM peak hour and 35 in and 75 out trips during the PM peak hour.

Methodology

Signalized Intersections

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in the *2000 Highway Capacity Manual* (HCM). The delay values (seconds) were qualified with a corresponding intersection LOS.

Unsignalized Intersections

Unsignalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay and LOS were determined based upon the procedures found in the 2000 HCM.

Street Segments

Street segments were analyzed based upon the comparison of ADT to either the SANTEC *Roadway Classifications, Levels of Service and Average Daily Traffic* table (Solana Beach), or the City of Encinitas' *Roadway Capacity Standards* table, as appropriate.

Alternative 2A**Street Segments**

Table 3.10-5 shows the pre-construction and construction peak hour roadway segment operations. As shown in the table, study area roadway segments would operate at LOS D or better with the exception of Lomas Santa Fe Drive from Solana Hills Drive to I-5, which would continue to operate at LOS E. While the service level remains at LOS E, the volume to capacity (V/C) increase does not exceed the 0.020 V/C maximum identified in the SANTEC/Institute for Transportation Engineers (ITE) guidelines. Thus, **a less than significant direct or indirect traffic impact would result along street segments during pre-construction and construction activities and impacts are not considered substantially adverse (Criterion A).**

**Table 3.10-5
Street Segment Operations**

Street Segment	Pre-Construction			Construction Period			
	ADT	LOS	V/C	ADT	LOS	V/C	Δ
Coast Highway 101							
North of Chesterfield Drive	16,700	A	0.474	16,700	A	0.474	0.000
South of Chesterfield Drive	20,180	A	0.573	20,310	A	0.577	0.004
North of Lomas Santa Fe Drive ¹	18,040	C	0.601	18,396	C	0.613	0.012
Chesterfield Drive							
East of Coast Highway 101	17,950	A	0.554	17,990	A	0.555	0.001
San Elijo Avenue							
South of Chesterfield Drive	670	A	0.034	710	A	0.036	0.002
Manchester Avenue							
West of I-5 Southbound Ramps	7,100	A	0.355	7,146	A	0.357	0.002
East of I-5 Northbound Ramps	28,240	D	0.872	28,264	D	0.872	0.001
Rios Avenue							
North of Lomas Santa Fe Drive ²	2,080	A	0.260	2,086	A	0.261	0.001
Lomas Santa Fe Drive							
East of Coast Highway 101	19,950	B	0.499	20,312	B	0.508	0.009
Hilmen Drive to Stevens Avenue	23,410	C	0.585	23,772	C	0.594	0.009
Solana Hills Drive to I-5	38,530	E	0.963	38,892	E	0.972	0.009

Capacities based on City of Encinitas and Solana Beach roadway classification tables.

Δ=Change in delay due to construction traffic.

¹ Coast Highway 101 north of Lomas Santa Fe Drive is constructed with one lane in the southbound direction and two lanes in the northbound direction separated by a landscaped raised median. Therefore, a modified capacity of 30,000 ADT for a 4-Lane Major Arterial was used in the analysis.

² A nominal number of trips generated during the vegetation removal phase of the project would be expected to use Rios Avenue to reach a site access/staging area at the northern terminus of this residential roadway (6 ADT).

Intersections

Table 3.10-6 shows the pre-construction and construction peak hour intersection operations. As shown in the table, study area roadway intersections would operate at LOS D or better with the addition of construction traffic. **Thus, a less than significant direct or indirect traffic impact would result at intersections during pre-construction and construction activities and impacts are not considered substantially adverse (Criterion A).**

**Table 3.10-6
Intersection Operations**

Intersection	Control Type	Peak Hour	Pre-Construction		Construction Period		
			Delay ¹	LOS	Delay	LOS	Δ^2
Chesterfield Drive/Coast Highway 101	Signal	AM	20.3	C	20.2	C	0.0
		PM	27.4	C	27.4	C	0.0
Chesterfield Drive/San Elijo Avenue	Signal	AM	23.3	C	23.5	C	0.2
		PM	21.7	C	21.8	C	0.1
Manchester Avenue/I-5 Southbound Ramps	All Way Stop Controlled	AM	17.5	C	17.5	C	0.0
		PM	12.4	B	12.6	B	0.2
Manchester Avenue/I-5 Northbound Ramps	Signal	AM	18.5	B	18.7	B	0.2
		PM	23.6	C	24.0	C	0.4
Lomas Santa Fe Drive/Coast Highway 101	Signal	AM	29.8	C	31.9	C	2.1
		PM	34.6	C	37.3	C	2.3
Lomas Santa Fe Drive/Rios Avenue ³	Signal	AM	10.8	B	10.8	B	0.0
		PM	11.9	B	11.9	B	0.0
Lomas Santa Fe Drive/I-5 Southbound Ramps	Signal	AM	20.2	C	20.5	C	0.5
		PM	19.8	B	20.2	C	0.4
Lomas Santa Fe Drive/I-5 Northbound Ramps	Signal	AM	49.2	D	49.8	D	0.6
		PM	29.2	C	29.6	C	0.4

¹ Average delay expressed in seconds per vehicle.

² Δ =Change in delay due to construction traffic.

³ Although vegetation removal traffic was assigned to the Lomas Santa Fe/Rios Avenue intersection due to the location of a project access/staging area at the terminus of this residential street, 0 trips would be expected to occur during the AM/PM peak hours.

Bridge Construction

The road along Coast Highway 101 across the mouth of the lagoon would be demolished and replaced with the proposed bridge in two parts. Two-way traffic would be maintained throughout the 18-month construction period.

Traffic volume on Coast Highway 101 near the bridge includes both discretionary trips and necessary trips. “Discretionary” trips are those made on Coast Highway 101 out of convenience or pleasure. “Necessary” trips along Coast Highway 101 would consist of local residential or

business trips between coastal cities that would use the road as the fastest route between destinations. With respect to bridge construction, it is assumed that necessary trips would remain on Coast Highway 101, despite the diminished capacity through the construction zone, while discretionary trips would either avoid Coast Highway 101 altogether, or would divert to I-5 before the construction zone. The final lateral roadways to divert to would be (from the south) Lomas Santa Fe Drive, or (from the north) Manchester Avenue via Chesterfield Drive.

During the construction period, the volume on the subject segment of Coast Highway 101 is 20,310 ADT, with a four-lane roadway capacity of 35,200 ADT. When the bridge construction occurs, roadway capacity would be reduced by two lanes (50 percent), to 17,600 ADT. Assuming that all 20,310 ADT wish to be on this segment, the latent, unserved demand of the reduced-capacity roadway is thus 2,710 ADT (20,310 ADT demand – 17,600 ADT served = 2,710 ADT unserved). These would be characterized as discretionary trips, which would utilize I-5 as an alternate route. Assuming this unserved Coast Highway 101 volume (1,355 northbound and 1,355 southbound) waited until the last opportunity to exit Coast Highway 101 to divert to I-5, it would utilize Lomas Santa Fe Drive and Chesterfield Drive, respectively.

Table 3.10-7 shows the daily segment operations on the affected roadways in the study area with the 2,710 ADT diverted. This table shows that segments affected by the bridge lane closure would continue to operate at acceptable LOS C or better with the following exceptions:

- Coast Highway 101 – South of Chesterfield Drive, LOS E
- Lomas Santa Fe Drive – Solana Hills Drive to I-5, LOS F

The degradation of these two roadway segments would exceed the allowable thresholds during bridge construction activities and would be considered a **temporary direct significant and substantially adverse impact (Criterion A)**.

Summer/Special Event Season

Construction is expected to begin in January 2016 and be completed by spring 2019 and would overlap with two summer seasons when special events such as the San Diego County Fair and the Del Mar Races are held. Phases 1, 2, and 4 of Alternative 2A and Alternative 1B, and Alternative 1A include activities that would overlap with a summer season. For Alternative 2A, the first two phases also include the first 10 months of bridge construction, including the partial closure of the Coast Highway 101 bridge, which would coincide with the summer 2018 fair and race season.

Table 3.10-7
Bridge Replacement Street Segment Operations

Street Segment	Construction Period without Bridge Lane Closures				Construction Period with Bridge Lane Closure					
	Capacity (LOS E) ¹	ADT	LOS	V/C	Capacity (LOS E) ¹	Diverted Trips	ADT	LOS	V/C	Δ ²
Coast Highway 101										
North of Chesterfield Drive	35,200	16,700	A	0.474	35,200	-	16,700	A	0.474	0.000
South of Chesterfield Drive	35,200	20,310	A	0.577	17,600	(2,710)	17,600	E	1.000	0.423
North of Lomas Santa Fe Drive	30,000	18,396	C	0.613	30,000	-	18,396	C	0.613	0.000
Chesterfield Drive										
East of Coast Highway 101	32,400	17,990	A	0.555	32,400	1,355	19,345	A	0.597	0.042
San Elijo Avenue										
South of Chesterfield Drive	20,000	710	A	0.036	20,000	1,355	2,065	A	0.103	0.068
Manchester Avenue										
West of I-5 Southbound Ramps	20,000	7,146	A	0.357	20,000	1,355	8,501	A	0.425	0.068
East of I-5 Northbound Ramps	32,400	28,264	D	0.872	32,400	,	28,264	D	0.872	0.000
Rios Avenue										
North of Lomas Santa Fe Drive	8,000	2,086	A	0.261	8,000	,	2,086	A	0.261	0.000
Lomas Santa Fe Drive										
East of Coast Highway 101	40,000	20,312	B	0.261	40,000	1,355	21,667	C	0.542	0.034
Hilmen Drive to Stevens Avenue	40,000	23,772	C	0.594	40,000	1,355	25,127	C	0.628	0.034
Solana Hills Drive to I-5	40,000	38,892	E	0.508	40,000	1,355	40,247	F	1.006	0.034

¹ Capacities based on City of Encinitas and City of Solana Beach roadway classification tables.

² Δ=Change in delay due to construction traffic.

Notes:

The two-lane capacity of Coast Highway 101 is half of the four-lane capacity (35,200 ADT ÷ 2 = 17,600 ADT)

The demand on Coast Highway 101 exceeds the reduced capacity by 2,710 ADT.

The excess demand (2,710 ADT) is expected to divert to Chesterfield Drive/Manchester Avenue and Lomas Santa Fe Drive.

The total diverted trips are divided by 2: northbound = 1,355 ADT to Lomas Santa Fe Drive; southbound = 1,355 ADT to Chesterfield Drive/Manchester Avenue

The Traffic Analysis Report (Appendix J) analyzed historical ADT count data to determine how lane closures on the bridge would affect summer-season weekday traffic volumes; the analysis in this document was conducted using weekday October 2012 traffic. A comparison of three summer scenarios—off-season typical summer traffic, summer fair traffic, and summer race traffic—and the October counts was conducted. The comparison showed that the average increase in weekday traffic during the summer months (off-season, and fair and race season) is generally 26 percent. The majority of this traffic increase occurs along Coast Highway 101 as beachgoers, visitors, and fairgrounds patrons travel this scenic route. It can therefore be anticipated that, during the peak summer/special event season while bridge construction is operating, an increase in traffic volumes of 26 percent could be expected within the study area in addition to the rerouting of “necessary” trips discussed above.

As shown in the Traffic Analysis Report (Appendix J), two roadway segments would be expected to continue to operate at LOS F during the summer and special event seasons during both the pre-construction and construction periods. These segments are Manchester Avenue (segment east of the I-5 NB ramps), and Lomas Santa Fe Drive (segment from Solana Hills Drive to I-5). **Since the increase in V/C on these two segments with the addition of project traffic does not exceed allowable thresholds, no significant or substantially adverse project impacts would be expected during the summer/special event season (Criterion A).**

However, the segments listed below would be negatively affected by the partial closure of the bridge during summer/special event season. These bridge lane closure impacts are at the same locations identified previously for degradation during bridge construction activities. Thus, the bridge lane closures would result in these previously identified impacts regardless of the season or time of year, but would not result in additional significant impacts during the summer/special event season.

- Coast Highway 101 – South of Chesterfield Drive, LOS E
- Lomas Santa Fe Drive – Solana Hills Drive to I-5, LOS F

Other Traffic and Circulation Considerations

The bridge reconstruction would occur during Phases 1 through 3 of the overall project. Bridge reconstruction would occur in two parts, with each part resulting in the closure of one side of the highway, although two-way traffic would be maintained at all times. Bridge reconstruction is anticipated to take 18 months total, 10 months for the first phase, and 8 months for the second. The highway alignment and bridge approach would conform to Caltrans standards for sight distance and vertical clearance (PDF-41). No new vehicle types (e.g., farm equipment) are anticipated to use the bridge and no intersections would be added to the alignment. No horizontal

curves would be added to the project with the exception of temporary detour lanes. Temporary detours would likely require a temporary speed limit reduction for the detour approaches and exits, but would still conform to safe highway design speeds (PDF-42). With incorporation of these project design features, implementation of Alternative 2A would not result in a substantial increase in hazards due to a design feature or incompatible uses. Bridge construction would result in a new and safely designed structure that would serve traffic in a manner similar to the existing roadway. The construction or operation of the project would not create new or incompatible transportation uses on the local circulation system. **These features would not substantially increase hazards or introduce incompatible uses along Coast Highway 101, and would not represent a significant impact (Criterion B). No substantial adverse impact would occur.**

As described in the street segment and intersection impact discussions above, construction of Alternative 2A would not generate traffic volumes that could cause poor traffic operating conditions in the study area. Reconstruction of the Coast Highway 101 bridge would result in reduced capacity during the construction period; this could result in inadequate emergency access along these roadway segments. However, a traffic management plan would be required by the cities of Encinitas and Solana Beach that would detail how traffic flow would be maintained in each direction at all times and would also outline safety and emergency procedures to ensure that adequate emergency access is available at all times through the impacted areas. Measures in the traffic control plan may include informing and coordinating with emergency services provided in the area, use of flagmen to control traffic flow and allow passage for emergency vehicles, etc. **Thus, temporary direct impacts to emergency access during construction activities related to the bridge reconstruction would be less than significant and are not considered substantially adverse (Criterion C).**

As described in the Existing Circulation System discussion above, various public transit, bicycle, and pedestrian facilities are incorporated into the circulation system throughout the study area. Additional temporary ADT added to the roadways during construction of the project would not obstruct or conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. Temporarily reduced roadway capacity during bridge reconstruction would affect public transit using that roadway in the same manner as it would traffic using the impacted roadway, including reduced speeds and potential delays. However, this temporary reduction of roadway capacity would be eliminated once the new bridge is complete, and traffic would return to normal operating conditions. This is not considered a significant conflict with policies or a decrease in the performance or safety of public transit opportunities. Pedestrian and bike access would be maintained across the roadway and bridge during construction. The new bridge structure would incorporate a Class 2 bike lane and separated pedestrian path to allow continued access along

Coast Highway 101. **No significant or substantial adverse impacts would occur (Criterion D).**

Inlet maintenance would be required under all alternatives. Under Alternative 2A, maintenance dredging would take approximately 5 months (occurring every 3–4 years) and would be accomplished via a pipeline discharging directly to the beach placement site. This would require equipment delivery and limited worker trips for the dredge (which requires few workers). For Alternative 1B and Alternative 1A, annual inlet maintenance would take approximately 4 and 2 weeks, respectively. Trucks would haul dredged material on an access route between Coast Highway 101 and the railroad ROW, under the Coast Highway 101 bridge to the beach site. These haul trips would not utilize public roadways, and traffic generated from maintenance dredging would be limited worker trips for the dredge.

As noted in the discussion of the traffic analysis, potential transportation impacts would only result during construction activities as there would be no substantial generation of vehicle trips once restoration activities and bridge reconstruction are complete. Thus, the project **would not result in substantial adverse or direct or indirect long-term significant impacts to access routes, local streets, or parking areas in the vicinity of the project area (Criterion E).**

Alternative 1B

Construction traffic operations associated with Alternative 1B are anticipated to be similar to those described under Alternative 2A. Specific trip generation numbers for each alternative may vary but would not be in excess of those analyzed for Alternative 2A. Therefore, the discussions of street segment operations and intersection operations above would also be applicable to this alternative.

Alternative 1B would require the existing Coast Highway 101 bridge to be retrofitted to address existing seismic deficiencies. No roadway features would be constructed with this alternative, **and there would be no substantially increased hazards or incompatible uses along Coast Highway 101. No significant or substantial adverse impact would occur (Criterion B).**

Similar to the measures discussed above under Alternative 2A concerning elements of a traffic control plan, a traffic control plan would also be required for Alternative 1B by the cities of Encinitas and Solana Beach to maintain emergency access and pedestrian/bike access during retrofit activities. Potential transportation impacts would only result during construction activities as there would be no substantial generation of vehicle trips or change to roadways once retrofit activities are complete and there would be no change to local streets, parking, or other transportation considerations. **Alternative 1B would not result in significant direct or indirect**

significant impacts to emergency access; impacts to transit, bicycle, or pedestrian facilities; or long-term impacts to access routes, local streets, or parking areas in the vicinity of the project area (Criteria C, D, and E). No substantial adverse impacts would occur.

Similar to Alternative 2A, the existing bridge would remain in service throughout the retrofitting activities, with two-way traffic flow maintained at all times with one side of the bridge closed and traffic rerouted to the other side while work was completed. While the duration and timing of the retrofitting would be shorter than complete bridge construction, the necessary lane closures are similar and thus would result in similar traffic impacts and trip redistribution as analyzed for Alternative 2A, although impacts would not last as long. Thus, as detailed under Alternative 2A, segments affected by the bridge lane closures would continue to operate at acceptable LOS C or better with the following exceptions:

- Coast Highway 101 – South of Chesterfield Drive, LOS E
- Lomas Santa Fe Drive – Solana Hills Drive to I-5, LOS F

The degradation of these two roadway segments would exceed the allowable thresholds during bridge retrofitting activities and would be considered a **temporary direct significant and substantial adverse impact with implementation of Alternative 1B (Criterion A).**

The existing bridge would remain in service throughout the retrofitting activities, with two-way traffic flow maintained at all times (PDF-43), with one side of the bridge closed and traffic rerouted to the other side while work was completed. No changes would be made to the existing roadway configuration. **Therefore, Alternative 1B would not substantially increase hazards or introduce incompatible uses along Coast Highway 101, and would not represent a significant impact (Criterion B). No substantial adverse impacts would occur.**

Alternative 1A

Construction traffic operations associated with Alternative 1A are anticipated to be similar to those described under Alternative 2A, because specific trip generation numbers for each alternative may vary but would not be in excess of those analyzed for Alternative 2A. Therefore, the discussions of street segment operations and intersection operations above would also be applicable to this alternative.

Alternative 1A would require the existing Coast Highway 101 bridge to be retrofitted to address existing seismic deficiencies. No roadway features would be constructed with this alternative, **and there would be no substantially increased hazards or incompatible uses along Coast Highway 101. No significant or substantial adverse impact would occur (Criterion B).**

Similar to the measures discussed above under Alternative 2A concerning elements of a traffic control plan, a traffic control plan would also be required for Alternative 1A by the cities of Encinitas and Solana Beach to maintain emergency access and pedestrian/bike access during retrofit activities. Potential transportation impacts would only result during construction activities as there would be no substantial generation of vehicle trips or change to roadways once retrofit activities are complete and there would be no change to local streets, parking, or other transportation considerations. **Alternative 1A would not result in significant direct or indirect significant impacts to emergency access; impacts to transit, bicycle, or pedestrian facilities; or long-term impacts to access routes, local streets, or parking areas in the vicinity of the project area (Criteria C, D, and E). No substantial adverse impacts would occur.**

Similar to Alternative 2A, the existing bridge would remain in service throughout the retrofitting activities, with two-way traffic flow maintained at all times with one side of the bridge closed and traffic rerouted to the other side while work was completed. While the duration of the retrofitting would be shorter than complete bridge construction, the necessary lane closures are similar and thus would result in similar traffic impacts and trip redistribution as analyzed for Alternative 2A, although impacts would not last as long. Thus, as detailed under Alternative 2A, segments affected by the bridge lane closures would continue to operate at acceptable LOS C or better with the following exceptions:

- Coast Highway 101 – South of Chesterfield Drive, LOS E
- Lomas Santa Fe Drive – Solana Hills Drive to I-5, LOS F

The degradation of these two roadway segments would exceed the allowable thresholds during bridge retrofitting activities and would be considered a **temporary direct significant and substantial adverse impact with implementation of Alternative 1A (Criterion A).**

The existing bridge would remain in service throughout the retrofitting activities, with two-way traffic flow maintained at all times (PDF-43), with one side of the bridge closed and traffic rerouted to the other side while work was completed. No changes would be made to the existing roadway configuration. **Therefore, Alternative 1A would not substantially increase hazards or introduce incompatible uses along Coast Highway 101, and would not represent a significant impact (Criterion B). No substantial adverse impacts would occur.**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in the addition of construction-related vehicle trips or the modification of local roadways. **There would be no significant**

or substantial adverse direct or indirect impact to traffic or circulation (Criteria A through E).

Materials Disposal/Reuse

As noted in Section 3.10.1, offshore and nearshore disposal/reuse materials placement would be accomplished via ocean barge and pipeline and no land-based traffic would result; thus, offshore and nearshore scenarios are not discussed further. Since material from Alternative 1A would be disposed via pipeline and barge to LA-5 or reused within the proposed project footprint, this component is not discussed further. The traffic impact analysis for the onshore materials placement sites addresses the potential for the various alternatives to impact existing vehicular traffic and parking conditions in the vicinity of the placement sites. Information is largely incorporated from the 2012 RBSP EA/EIR.

Alternative 2A and Alternative 1B: Onshore Placement

Implementation of onshore materials placement for either of these alternatives would require delivery of construction equipment and commuting of work crews to onshore placement beaches. It is assumed that, at a maximum, a 12-person crew would be working at a placement site at a time. Construction personnel would park in public parking areas adjacent to the sites but would not create significant direct parking impacts given the small number of spaces required at each site and the short duration of placement at each site. Sand placement activities would not significantly affect traffic, as these activities would generate very few trips and would not be located on public roadways or transit facilities. Pedestrian and bike access, as well as emergency access, would be maintained throughout construction. The small increases in traffic volumes and project parking needs during material placement activities would be localized and temporary and **are not considered substantially adverse. Less than significant direct impacts to existing traffic and circulation patterns; emergency access; and public transit, bicycle, or pedestrian facilities would occur (Criteria A, C, and D).**

Subsequent to the completion of sand placement, some changes in traffic could occur. The material placement at sites where there is currently little sand could make these locations more attractive to both residents and tourists, and it is expected that traffic could increase accordingly. The use of parking would also increase. Some of the increase would come from new users, and some would come from users of adjacent, currently sandy, but less convenient beaches. In the latter case, some decrease in traffic would occur at the adjacent beaches. Because sand placement would be limited to beaches and no changes to existing public facilities or roadways would occur, **hazards would not increase due to a project design feature or incompatible uses and no significant or substantial adverse impacts would occur (Criterion B).**

The most severe traffic and parking congestion would continue to occur on warm summer weekends and holidays, and the improvement of the specific beaches with sand placement may induce additional use that would marginally increase the congestion for the period during which additional placed sand remained on the beach. Traffic and parking congestion at beaches is an accepted occurrence, and it is not common practice to design infrastructure to accommodate these peak loads. Additionally, sand placed at individual sites is predicted to remain noticeable at each beach for an average of 5 years as the sand is distributed throughout the littoral cell. **The long-term indirect impact of the proposed material placement on traffic and parking is not considered substantially adverse and would be less than significant (Criterion E).**

3.10.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Bridge replacement construction activities associated with Alternative 2A and bridge retrofitting activities under Alternative 1B and Alternative 1A would result in a substantial adverse and significant traffic impact under both NEPA and CEQA, respectively. Project design features would be incorporated into the project to avoid or minimize other traffic impacts, including maintaining two-way traffic during construction and conforming to standards regarding sight distance and safe design speeds both during and after construction, as applicable. Mitigation measures Traffic-1 and Traffic-2 would be required to address significant and adverse impacts associated with lane closure along Coast Highway 101.

Lagoon Restoration

- Traffic-1 Prepare work zone traffic control plans for lane closures and related construction along Coast Highway 101. The work zone traffic control plans shall be prepared in accordance with the California Manual of Uniform Traffic Control Devices (CAMUTCD), Caltrans Standard Plans (2010), and current standards and best practices of the reviewing and approving agencies. These plans are intended to accommodate workers within the roadway, while facilitating continued circulation for road users (motorists, bicyclists, and pedestrians including persons with disabilities in accordance with the ADA) through the work zone.
- Traffic-2 Provide advanced notification to motorists that delays and traffic congestion will occur during bridge construction and retrofitting activities to encourage avoidance of the construction area. This notification may be accomplished through various measures such as information and detour routes included on the project website; traffic details included in notifications sent to local residents; traffic and alternative route information published in local media; and physical traffic control measures, such as temporary signage located at various distances from the construction area.

Additional mitigation measures to reduce the traffic congestion on segments of Coast Highway 101 and Lomas Santa Fe were considered, but none were found feasible to mitigate the temporary traffic impacts due to bridge construction or retrofitting. Typically, to lessen congestion impacts due to high traffic volume on a lower-capacity roadway, a project could decrease the trips it would generate through scaling back the project (e.g., reducing unit count, decreasing square footage, etc.). However, the proposed project is not a high-volume trip-generating type of project and the significant impact is a result of temporarily diminished road capacity due to the bridge construction or retrofitting, not increased traffic volume; thus, typical measures to address V/C issues are not feasible. Other methods of increasing roadway to minimize significant traffic impacts include widening the roadway. This would require the acquisition of ROW from both commercial and residential properties along the impacted roadway segments of Coast Highway 101 and Lomas Santa Fe. This would cause substantial disruptions to the local community, residents, and businesses; cause adverse effects to parking and access to the local beach and recreation areas; and would also be very expensive. Additionally, this permanent measure is not appropriate to correct a temporary short-term impact that would be resolved once the new bridge is operational or existing bridge retrofit work is complete. Thus, roadway widening is not a feasible solution for the temporary traffic impact. Temporary roadway modifications, such as restriping, use of roadway shoulders as lanes, or signal timing could be implemented to better handle increased traffic volume on the existing roadway. However, the impacted segments of Coast Highway 101 and Lomas Santa Fe are not appropriate locations for these types of modifications, mostly due to limited space available for modifications and the potential safety implications of such actions.

Based on the above discussion, there is no additional feasible mitigation to further reduce temporary direct impacts caused by the reduction in capacity associated with the demolition and construction of the bridge under Alternative 2A or bridge retrofitting under Alternative 1B or Alternative 1A to less than significant.

Materials Disposal/Reuse

Potential impacts would be less than significant for all alternatives and no mitigation measures are proposed.

3.10.5 LEVEL OF IMPACT AFTER MITIGATION

Lagoon Restoration

CEQA: By preparing a traffic control plan and notifying motorists of delays and suggesting earlier detour routes, as required in mitigation measures Traffic-1 and Traffic-2, some traffic

volume in the construction area may be reduced as appropriate traffic control measures would be in place and people could choose to exit from Coast Highway 101 before reaching the immediate area where most traffic congestion would occur. It is not possible to predict the number of trips this measure would eliminate along the impacted roadway segments, but it is not anticipated to reduce the traffic volume to below a level of significance.

No additional feasible mitigation is available to reduce the traffic impacts resulting from temporarily reduced capacity due to the Coast Highway 101 bridge construction activities associated with Alternative 2A and bridge retrofitting activities associated with Alternative 1B and Alternative 1A. Impacts would remain significant and unavoidable.

Because full roadway capacity would resume after completion of the new bridge or completion of the existing bridge retrofit work, the temporary traffic impacts would be eliminated at that time and traffic operations would revert to their previously acceptable conditions.

NEPA: By preparing a traffic control plan and notifying motorists of delays and suggesting earlier detour routes, as required in mitigation measures Traffic-1 and Traffic-2, some traffic volume in the construction area may be reduced as appropriate traffic control measures would be in place and people could choose to exit from Coast Highway 101 before reaching the immediate area where most traffic congestion would occur. It is not possible to predict the number of trips this measure would eliminate along the impacted roadway segments, however, and substantial adverse impacts may still occur.

No additional feasible mitigation is available to reduce the traffic impacts resulting from temporarily reduced capacity due to the Coast Highway 101 bridge construction activities associated with Alternative 2A and bridge retrofitting activities associated with Alternative 1B and Alternative 1A.

Because full roadway capacity would resume after completion of the new bridge or completion of the existing bridge retrofit work, the temporary traffic impacts would be eliminated at that time and traffic operations would revert to their previously acceptable conditions.

Materials Disposal

CEQA: Potential impacts would be less than significant and no mitigation measures are proposed.

NEPA: No substantial adverse impacts would occur and no mitigation measures are proposed.

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3.11 AIR QUALITY

This section describes existing air quality conditions in the project area, summarizes applicable regulations, and analyzes potential short-term construction and long-term operational air quality impacts of the proposed project and alternatives. In addition, mitigation measures are recommended, as necessary, to reduce significant air quality impacts. Model calculations are included in Appendix K.

3.11.1 AFFECTED ENVIRONMENT

Air quality is defined by the concentration of pollutants related to human health. Concentrations of air pollutants are determined by the rate and location of pollutant emissions released by pollution sources, and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, and sunlight. Therefore, ambient air quality conditions within the local air basin are influenced by such natural factors as topography, meteorology, and climate, in addition to the amount of air pollutant emissions released by existing air pollutant sources. Under CEQA, existing emissions levels from current land uses and activities on a project site can be estimated to establish baseline conditions. However, since the SELRP site does not currently encompass any developed land uses or construction activities, analysis of existing emission levels was not conducted. The project only involves construction activities. The analysis conservatively compares the total emissions associated with the project to the thresholds of significance.

Climate, Topography, and Meteorology

Climate, topography, and meteorology influence regional and local ambient air quality. Southern California is characterized as a semiarid climate, although it contains three distinct zones of rainfall that coincide with the coast, mountain, and desert. San Elijo Lagoon is located in the City of Encinitas in the central coastal portion of San Diego County, and within the San Diego Air Basin (SDAB). The SDAB is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean to the west and high mountain ranges to the east. The topography in the SDAB region varies greatly, from beaches on the west, to mountains and then desert to the east. The mountains to the east inhibit the dispersion of pollutants (generated in the SDAB) to the east.

The climate of the SDAB is characterized by warm, dry summers and mild winters. One of the main determinants of its climatology is a semipermanent high-pressure area (the Pacific High) in the eastern Pacific Ocean. This high-pressure cell maintains clear skies for much of the year. When the Pacific High moves southward during the winter, this pattern changes, and low-

pressure storms are brought into the region, causing widespread precipitation. During fall, the region often experiences dry, warm easterly winds, locally referred to as Santa Ana winds, which raise temperatures and lower humidity, often to less than 20 percent. Rainfall in the City of Oceanside, which is the nearest climate monitoring station near the City of Encinitas, averages approximately 10.54 inches annually (WRCC 2012). The heaviest precipitation occurs in November through April. The mean annual air temperature is 60.3 degrees Fahrenheit (°F), and the mean maximum and mean minimum temperatures are 67.6°F and 52.9°F, respectively (WRCC 2012).

A dominant characteristic of spring and summer is night and early morning cloudiness, locally known as the marine layer. Low clouds form regularly, frequently extending inland over the coastal foothills and valleys. These clouds usually dissipate during the morning, and afternoons are generally clear.

A common atmospheric condition known as a temperature inversion affects air quality in the SDAB. During an inversion, air temperatures get warmer rather than cooler with increasing height. Inversion layers are important for local air quality, because they inhibit the dispersion of pollutants and result in a temporary degradation of air quality. The pollution potential of an area is largely dependent on a combination of winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and low-level inversions produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 mph, the atmospheric pollution potential is greatly reduced.

Criteria Air Pollutants

The California Air Resources Board (ARB) and EPA focus on the following air pollutants as indicators of ambient air quality: ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less (PM₁₀), fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less (PM_{2.5}), and lead. Because these are the most prevalent air pollutants known to be harmful to human health and EPA regulates them by developing criteria for allowable emission levels, they are commonly referred to as “criteria air pollutants.”

Health-based air quality standards have been established for these pollutants by ARB at the state level and by EPA at the national level. These standards were established to protect the public with a margin of safety from adverse health impacts due to exposure to air pollution. California has also established standards for sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. A brief description of each criteria air pollutant, including source types and

Table 3.11-1
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards ^a	National Standards ^b	
		Concentration ^c	Primary ^{c,d}	Secondary ^{c,e}
Ozone	1 hour	0.09 ppm (180 µg/m ³)	—	Same as primary standard
	8 hours	0.070 ppm (137 µg/m ³)	0.075 ppm (147 µg/m ³)	
Respirable particulate matter (PM ₁₀) ^f	24 hours	50 µg/m ³	150 µg/m ³	Same as primary standard
	Annual arithmetic mean	20 µg/m ³	—	
Fine particulate matter (PM _{2.5}) ^f	24 hours	—	35 µg/m ³	Same as primary standard
	Annual arithmetic mean	12 µg/m ³	12 µg/m ³	15 µg/m ³
Carbon monoxide	8 hours	9.0 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	None
	1 hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	
	8 hours (Lake Tahoe)	6 ppm (7 mg/m ³)	—	—
Nitrogen dioxide ^g	Annual arithmetic mean	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as primary standard
	1 hour	0.18 ppm (339 µg/m ³)	100 ppb (188 µg/m ³)	None
Sulfur dioxide ^h	Annual arithmetic mean	—	0.030 ppm (for certain areas) ^h	—
	24 hours	0.04 ppm (105 µg/m ³)	0.14 ppm (for certain areas) ^h	—
	3 hours	—	—	0.5 ppm (1,300 µg/m ³)
	1 hour	0.25 ppm (655 µg/m ³)	75 ppb (196 µg/m ³)	—
Lead ^{i,j}	30-day average	1.5 µg/m ³	—	—
	Calendar quarter	—	1.5 µg/m ³ (for certain areas) ^j	Same as primary standard
	Rolling 3-month average	—	0.15 µg/m ³	
Visibility-reducing particles ^k	8 hours	See footnote k	No national standards	
Sulfates	24 hours	25 µg/m ³		
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m ³)		
Vinyl chloride ^l	24 hours	0.01 ppm (26 µg/m ³)		

Notes: mg/m³ = milligrams per cubic meter; PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppb = parts per billion; ppm = parts per million; µg/m³ = micrograms per cubic meter

^a California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM₁₀, PM_{2.5}, and visibility-reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

^b National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM₁₀, the 24-hour is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than 1. For PM_{2.5}, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standards. Contact EPA for further clarification and current national policies.

^c Concentration expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and reference pressure of 760 torr; parts per million (ppm) in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

^d National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

^e National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^f On December 14, 2012, the national annual PM_{2.5} primary standard was lowered from 15 µg/m³ to 12.0 µg/m³. The existing national 24-hour PM_{2.5} standards (primary and secondary) were retained at 35 µg/m³, as was the annual secondary standard of 15 µg/m³. The existing 24-hour PM₁₀ standards (primary and secondary) of 150 µg/m³ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

^g To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

Source: ARB 2013

On June 2, 2010, a new 1-hour SO₂ standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO₂ national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

ⁱ The California Air Resources Board (ARB) has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

^j The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standards are approved.

^k In 1989, ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and the "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

impacts to health, is provided below along with the most current monitoring station data and attainment designations for the project study areas. Table 3.11-1 presents the California Ambient Air Quality Standards (CAAQS) and the National Ambient Air Quality Standards (NAAQS).

Ozone

Ozone is a colorless, odorless gas that primarily exists as a beneficial component of the ozone layer in the upper atmosphere (stratosphere) and as a pollutant in the lower atmosphere (troposphere). Tropospheric ozone is a principal cause of lung and eye irritation in the urban environment. It is the principal component of smog, which is formed in the troposphere through a series of reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_x) in the presence of sunlight. Therefore, ROG and NO_x are precursors of ozone. ROG and NO_x emissions are both considered critical in ozone formation. Control strategies for ozone have focused on reducing ROG and NO_x emissions from vehicles, industrial processes using solvents and coatings, and consumer products. Ozone concentrations are generally greatest in the summer, when atmospheric inversions are greatest and the presence of sunlight and heat is high. The SDAB is classified as a federal nonattainment area for ozone.

Particulate Matter (PM)

PM is a complex mixture of extremely small particles and liquid droplets. PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Natural sources of particulates include windblown dust and ocean spray. Some particles are emitted directly into the atmosphere. Others, referred to as secondary particles, result from gases that are transformed into particles through physical and chemical processes in the atmosphere.

The size of PM is directly linked to the potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller because those are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects such as aggravation of respiratory and cardiovascular disease, lung disease, and decreased lung function. Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. EPA groups PM into two categories, coarse PM (PM_{10}), and fine PM ($\text{PM}_{2.5}$), as described below.

Inhalable coarse particles (PM_{10}) consist of PM emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and PM formed in the atmosphere by reaction of gaseous precursors.

Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads. Control of PM₁₀ is primarily achieved through the control of dust at construction and industrial sites, the cleaning of paved roads, and the wetting or paving of frequently used unpaved roads.

PM₁₀ includes the subgroup of finer particles (PM_{2.5}), such as those found in smoke and haze, with an aerodynamic diameter of 2.5 microns or smaller. These finer particles pose an increased health risk because they can deposit deep in the lungs and contain substances that are particularly harmful to human health. Sources of fine particles include all types of combustion activities such as motor vehicles, power plants, wood burning, and certain industrial processes. PM_{2.5} is the major cause of reduced visibility (haze) in California.

Carbon Monoxide (CO)

CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Overall, CO emissions are decreasing because of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973. CO concentrations are typically higher in the winter due to higher rates of combustion inefficiency in colder engines; therefore, California has required the use of oxygenated gasoline in the winter months to reduce CO emissions.

Relatively high concentrations of CO are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Vehicle traffic emissions can cause localized CO impacts, and severe vehicle congestion at major signalized intersections can generate elevated CO levels, called “hotspots,” that can be hazardous to human receptors adjacent to the intersections.

Nitrogen Dioxide (NO₂)

NO₂ is a gas that is a product of the combustion of fossil fuels generated from vehicles and stationary sources, such as power plants and boilers. NO₂ can cause lung damage. As noted above, NO₂ is a type of NO_x and is a principal contributor to ozone and smog production.

Sulfur Dioxide (SO₂)

SO₂ is a gas that is a product of the combustion of fossil fuels, with the primary source being power plants and heavy industry that utilize coal or oil as fuel. SO₂ is also a product of diesel

engine emissions. The human health effects of SO₂ include lung disease and breathing problems for asthmatics. SO₂ in the atmosphere contributes to the formation of acid rain. In the SDAB, there is relatively little combustion of coal and oil; therefore, SO₂ is less of a concern than in other parts of the country.

Lead

Lead is a highly toxic metal that may cause a range of human health effects. Lead anti-knock additives in gasoline represent a major source of lead emissions to the atmosphere. However, lead emissions have significantly decreased due to the near elimination of leaded gasoline use. Lead-based paint, banned or limited by EPA in the 1980s, is a health hazard when it deteriorates by peeling, chipping, or cracking; or generates lead dust when scraped, sanded, or heated.

Odor

Odor is considered an air quality issue, either at the local level (e.g., odor from wastewater treatment) or at the regional level (e.g., smoke from wildfires). An air pollutant means fume, smoke, PM, vapor, gas, odorous substance, or any combination thereof. Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

SDAB Attainment Status

Specific geographic areas are classified as either “attainment” or “nonattainment” areas for each pollutant based on the comparison of measured data with federal and state standards. The SDAB currently meets NAAQS for all criteria air pollutants except ozone, and meets CAAQS for all criteria air pollutants except ozone, PM₁₀, and PM_{2.5}. The SDAB currently falls under a federal maintenance plan for CO, following a 1998 redesignation as a CO attainment area. The SDAB is currently classified as a state nonattainment area for ozone, PM₁₀, and PM_{2.5}.

SDAB Existing Air Quality

Ambient air pollutant concentrations in the SDAB are measured at air quality monitoring stations operated by ARB and SDAPCD. The closest and most representative SDAPCD air quality monitoring station to the project site is the Del Mar monitoring station, located at 215 9th Street in Del Mar, California. However, that monitoring station only collects data on concentrations of ozone. The closest monitoring station with complete data is the Escondido monitoring station, located at 600 East Valley Parkway in Escondido, California. Table 3.11-2 presents the most

recent available data over the past 3 years from the Del Mar and Escondido monitoring stations as summaries of the exceedances of standards and the highest pollutant levels recorded for years 2010 through 2012.

**Table 3.11-2
Ambient Air Quality Summary – Del Mar and Escondido Monitoring Stations**

Pollutant Standards	2010	2011	2012
Carbon Monoxide (CO)			
National maximum 8-hour concentration (ppm)	2.46	2.20	3.61
State maximum 8-hour concentration (ppm)	2.46	2.30	3.70
State maximum 1-hour concentration (ppm)	3.9	3.5	4.4
<u>Number of Days Standard Exceeded</u>			
NAAQS 8-hour (>9.0 ppm)	0	0	0
CAAQS 8-hour (>9.0 ppm)	0	0	0
CAAQS 1-hour (>20.0 ppm)	0	0	0
Nitrogen Dioxide (NO₂)			
State maximum 1-hour concentration (ppm)	0.064	0.062	0.062
Annual Average (ppm)	0.014	*	0.013
<u>Number of Days Standard Exceeded</u>			
CAAQS 1-hour	0	0	0
Ozone			
State max 1-hour concentration (ppm)	0.085	0.091	0.088
National maximum 8-hour concentration (ppm)	0.072	0.075	0.079
<u>Number of Days Standard Exceeded</u>			
CAAQS 1-hour (>0.09 ppm)	0	0	0
CAAQS 8-hour (>0.070 ppm)/NAAQS 8-hour (>0.075 ppm)	2/0	1/0	2/2
Particulate Matter (PM₁₀)^a			
National maximum 24-hour concentration (µg/m ³)	42.0	40.0	33.0
State maximum 24-hour concentration (µg/m ³)	43.0	40.0	33.0
State annual average concentration (µg/m ³)	21.0	18.8	18.1
<u>Estimated Number of Days Standard Exceeded</u>			
NAAQS 24-hour (>150 µg/m ³)	0	0	0
CAAQS 24-hour (>50 µg/m ³)	0	0	0
Particulate Matter (PM_{2.5})^a			
National maximum 24-hour concentration (µg/m ³)	48.4	69.8	70.7
State maximum 24-hour concentration (µg/m ³)	52.2	27.4	70.7
National annual average concentration (µg/m ³)	12.7	13.2	10.8
State annual average concentration (µg/m ³)	*	10.4	*
<u>Estimated Number of Days Standard Exceeded</u>			
NAAQS 24-hour (>35 µg/m ³)	2	3	1

µg/m³ = micrograms per cubic meter; ppm == parts per million

Source: ARB 2014

As shown in Table 3.11-2, ambient air concentrations of CO, NO₂, and PM₁₀ at the Del Mar and Escondido monitoring stations have not exceeded the NAAQS/CAAQS in the past 3 years. PM_{2.5} concentrations exceeded the federal standards every year for the past 3 years, and concentrations of 8-hour ozone registered at the monitoring station have also exceeded the CAAQS every year in the past 3 years.

Sensitive Receptors

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. These include children, the elderly, people with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Air quality regulators typically define sensitive receptors as schools, hospitals, resident care facilities, day-care centers, or other facilities that may house individuals with health conditions that would be adversely impacted by changes in air quality.

Residential areas are also considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise are generally short. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent as the majority of the workers tend to stay indoors most of the time.

3.11.2 THRESHOLDS FOR DETERMINING SIGNIFICANCE

A significant impact related to air quality would occur under CEQA if implementation of the project would:

- A. Conflict with or obstruct implementation of the applicable air quality plan;
- B. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- C. Expose sensitive receptors to substantial pollutant concentrations; or
- D. Create objectionable odors affecting a substantial number of people.

These significance thresholds were derived from Appendix G of the State CEQA Guidelines. As stated in Appendix G, the significance criteria established by the applicable air quality management board or air pollution control district may be relied on to make the impact determinations for specific program elements. SDAPCD has not developed quantitative significance thresholds for CEQA projects. However, San Diego County has established recommended screening level thresholds of significance for regional pollutant emissions. Since SDAPCD does not have quantitative significance thresholds, the San Diego County screening thresholds of significance for regional pollutant emissions were used to analyze the impacts of the project. A project with emissions rates below these thresholds is considered to have a less than significant impact on regional and local air quality throughout the SDAB. The County of San Diego *Guidelines for Determining Significance and Report Format and Content Requirements, Air Quality* (2007), which outline these screening level thresholds, state that a project that results in an emissions increase less than these levels would not:

- cause a violation of a state or national ambient air quality standard anywhere that does not already exceed such standard,
- cause additional violations of a national ambient air quality standard anywhere the standard is already being exceeded,
- cause additional violations of a state ambient air quality standard anywhere the standard is already being exceeded, or
- prevent or interfere with the attainment or maintenance of any state or national ambient air quality standard.

Therefore, if the emissions of the proposed project are found to be below the screening level thresholds, it can be concluded that the project would not lead to a violation of a NAAQS or CAAQS. The screening level thresholds are shown in Table 3.11-3.

**Table 3.11-3
Regional Pollutant Emission Screening Level Thresholds of Significance**

	ROG	NO_x	CO	SO_x	PM₁₀	PM_{2.5}	Lead
Pounds per hour	–	25	100	25	–	–	–
Pounds per day	75	250	550	250	100	55	3.2
Tons per year	13.7	40	100	40	15	10	0.6

ROG = reactive organic gases; NO_x = oxides of nitrogen; SO_x = sulfur oxides; CO = carbon monoxide; PM₁₀ = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less, PM_{2.5} = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less

– = No threshold proposed

Source: County of San Diego 2007

This analysis does not directly evaluate lead or oxides of sulfur (SO_x) because little to no quantifiable and foreseeable emissions of these substances would be generated by the project. Lead emissions have significantly decreased due to the near elimination of leaded fuel use. On- and off-road diesel fuel used in California must meet low sulfur standards established by ARB; thus, SO_x emissions due to diesel exhaust are assumed to be minimal. The cumulative analysis for air quality is included in Chapter 4 of this EIR/EIS, and analyzes whether the project would result in a considerable net increase of criteria pollutants for which the project region is designated nonattainment.

NEPA analysis for air quality impacts is provided separately from the CEQA analysis. The General Conformity Rule (40 CFR Sections 51.850–51.860 and 93.150–93.160) requires any federal agency responsible for an action in a federal nonattainment or attainment/maintenance area to demonstrate conformity to the applicable State Implementation Plan (SIP). To do so, the federal agency must determine that the action is either exempt from General Conformity Rule requirements or subject to a formal conformity determination. Conformance to the SIP is demonstrated by obtaining appropriate permits from SDAPCD, or by demonstrating that emissions would be less than *de minimis* thresholds.

General conformity *de minimis* thresholds are appropriate thresholds to be used for determining NEPA significance. A NEPA air quality significance analysis differs from the General Conformity analysis in that all project criteria pollutant emissions are considered: emissions for pollutants where the area has attained the NAAQS, as well as emissions for pollutants where the region is currently designated as a nonattainment or maintenance area. Therefore, in the SDAB, project attainment emissions of SO_x, PM₁₀, and PM_{2.5}, would be considered for impact significance under NEPA for air quality in addition to CO, ROG, and NO_x considered under General Conformity.

The total annual direct and indirect project emissions of attainment pollutants, as well as the emissions of nonattainment/maintenance pollutants (analyzed for General Conformity) from project construction and operation activities would be compared against the *de minimis* levels for the attainment status of these pollutants. The applicable *de minimis* thresholds for the project emissions generated in the SDAB are shown in Table 3.11-4.

The principal source of water-based emissions from construction activities would be from diesel engines used for tugboat engines, dredge propulsion, and driving dredge pumps. Tugboats and dredges are registered through the state or permitted at the air district level based on hours of annual operation, not on a project-specific basis. Tugboats and dredges can be registered under ARB's Portable Equipment Registration Program or would be subject to the ARB Commercial Harbor Craft Regulation.

Table 3.11-4
Applicable General Conformity/NEPA Significance Thresholds

Pollutant	<i>De minimis</i> Emission Threshold (tons/year)
CO	100
NO _x	100
ROG	100
SO _x	100
PM ₁₀	100
PM _{2.5}	100

Source: 40 CFR Part 93

When applying for a permit, SDAPCD conducts an analysis based on the projected activity of the dredge on an annual basis. ARB and SDAPCD include an analysis of this equipment based on annual hours of operation. Because the air quality analysis for a dredge's annual permit accounts for the hours of equipment operation throughout the year, emissions would not be anticipated to occur above currently estimated levels as a result of the proposed project. However, to provide a conservative estimate of criteria pollutant emissions associated with the project alternatives, both land- and water-based emissions are included in the analysis.

Project impact significance under CEQA was determined by comparing the daily emissions for each project alternative to the San Diego County thresholds mentioned in Table 3.11-3. Project impact significance under NEPA was determined by comparing the annual emissions to the General Conformity *de minimis* thresholds in Table 3.11-4. Project alternatives with the potential to generate emissions exceeding the thresholds would have a significant impact (CEQA) or adverse effect (NEPA) on air quality. If the project alternative's emissions exceed the significance criteria, mitigation measures are available, depending on the nature of the air quality impact.

3.11.3 ENVIRONMENTAL CONSEQUENCES

Lagoon Restoration and Material Disposal

This analysis focuses on the criteria pollutant emissions resulting from construction and subsequent maintenance activities of the proposed project and alternatives. The analysis includes estimates of emissions associated with construction equipment, worker vehicle trips, dredge, and tugboat operation. Emissions from the operation of diesel-fueled off-road equipment were estimated by multiplying peak daily usage (i.e., hours per day) by equipment-specific emission factors and equipment-specific load factors consistent with ARB's off-road mobile source

emission inventory model, OFFROAD. Criteria air pollutant emissions from on-road motor vehicles were estimated using EMFAC2011 mobile source emission factors. Worker and heavy-duty truck trips were estimated based on data provided in the *Traffic Impact Analysis for San Elijo Lagoon Restoration Project* (LLG 2014). Criteria pollutant emissions associated with dredge equipment and tugboat operations were estimated using emission factors from ARB's Harbor Craft Emissions Inventory Database. Other detailed assumptions are provided in Appendix K.

Fugitive PM dust emissions are primarily associated with site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and miles traveled by construction vehicles on- and off-site. Fugitive dust emissions are associated with the use of construction equipment on unpaved surfaces, material dumping, and worker vehicle trips to the site. Since the majority of the construction activities for the project alternatives would occur within San Elijo Lagoon, the soil would be saturated, minimizing fugitive dust emissions. Based on the dredging and material disposal approach and schedule, it is not anticipated that the project would result in stockpiling of soil and related fugitive dust emissions. Therefore, the primary source of fugitive dust emissions for the project alternatives would be related to travel of heavy-duty vehicles on unpaved roads. Dust emissions were estimated using regional silt loading emission factors from EPA's Compilation of Air Pollutant Emission Factors (AP-42), including number of vehicles, vehicle weight, and vehicle miles traveled (VMT) per day.

This analysis evaluates the impacts of lagoon restoration and material disposal together. The finding of significance for the CEQA and NEPA thresholds cannot be determined separately and must be based on emissions for the entire project.

Alternative 2A

Temporary Impacts

Project consistency is based on whether the proposed project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Projects that are consistent with the assumptions used in development of the applicable air quality plan would not conflict with or obstruct the attainment of the air quality levels identified in the plan, even if the project-level emissions exceed the regional emissions thresholds.

The RAQS was developed pursuant to California Clean Air Act requirements and identifies feasible emissions control measures to provide expeditious progress in San Diego County toward attaining the state ozone standard. The RAQS control measures focus on emission sources under

SDAPCD authority, specifically stationary sources and some areawide sources. The RAQS identifies areawide sources as mostly residential sources, including water heaters, furnaces, architectural coatings, and consumer products. Assumptions for land use development used in the RAQS are taken from local and regional planning documents, including general plan land use designations and zoning.

Consistency with the RAQS is determined by analyzing a project with the assumptions in the RAQS. Emission forecasts rely on projections of VMT by the Metropolitan Planning Organizations, such as SANDAG, and population, employment, and land use projections made by local jurisdictions. The project is primarily a construction project that would involve dredging and off-road construction equipment operations. The project would not develop any land uses (e.g., residential or commercial) that would increase activities and/or emissions associated with on-road mobile sources. The use of construction equipment in the RAQS is estimated for the region on an annual basis, and construction-related emissions are estimated as an aggregate in the RAQS. The project would not increase the assumptions for off-road equipment use in the RAQS. On-road trip generation would also occur during construction of the proposed project. Since trip generation associated with construction would be temporary, the proposed project would not increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of the proposed project would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **This impact would be less than significant under CEQA (Criterion A).**

Construction of the proposed project would result in the temporary generation of ROG, CO, NO_x, PM₁₀, and PM_{2.5} emissions. During construction, criteria air pollutant and precursor emissions would be temporarily and intermittently generated from a variety of sources. Construction would require a combination of both dry and wet methods. Dry construction would involve land-based equipment, such as backhoes, dump trucks, and front-end loaders, to construct various project elements in dry conditions. Wet construction would involve working over water so that material could be removed using hydraulic dredge equipment. Construction equipment and vehicle engines would be maintained in good condition and properly tuned per manufacturers' specifications, and idling time would be limited, as appropriate, to minimize emissions (PDF-10).

The type of dredge equipment selected for the proposed project includes either a diesel-powered or electric dredge, so both equipment types were considered for this analysis. Facilities for electrical power would be provided for use by an electrical dredge. In addition, booster pumps may be necessary to convey material to the disposal locations. Dredging and pump operations could occur 24 hours per day and 7 days per week. To account for maintenance, fueling, and

other related activities, dredging and pump equipment is typically assumed to have intermittent periods of nonoperation. For the purposes of this project, dredge equipment is assumed to operate for approximately 20 hours per day. Off-road equipment was assumed to operate up to 10 hours per day and 6 days per week.

Heavy construction equipment would be brought to and taken from the site by way of the regional highway and local street network. Site preparation would also occur during the mobilization period. Generally, construction would occur in four sequential phases (Section 2.10), on a year-round basis.

As shown in Table 3.11-5, construction emissions for Alternative 2A would result in maximum daily emissions of approximately 100 pounds of ROG, 1,020 pounds of NO_x, 407 pounds of CO, 77 pounds of PM₁₀, and 35 pounds of PM_{2.5}. Additional modeling assumptions and details are provided in Appendix K.

Table 3.11-5
Alternative 2A – CEQA Estimated Daily Construction Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Phase 1					
Mobilization/Demobilization/Site Preparation	8	70	393	3	3
Construction Equipment/On-Road Vehicles	39	457	155	56	16
Dredging	48	448	199	16	15
Material Disposal	13	116	52	4	4
Phase 1 – Maximum Daily Emissions	100	1,020	407	77	35
Phase 2					
Construction Equipment/On-Road Vehicles	42	453	154	60	16
Dredging	48	448	199	16	15
Phase 2 – Maximum Daily Emissions	90	900	353	76	31
Phase 3					
Construction Equipment/On-Road Vehicles	36	386	134	57	14
Dredging	48	448	199	16	15
Phase 3 – Maximum Daily Emissions	85	833	333	73	29
Phase 4					
Mobilization/Demobilization	2	26	14	1	1
Construction Equipment/On-Road Vehicles	26	253	98	40	10
Dredging	48	448	199	16	15
Phase 4 – Maximum Daily Emissions	77	727	311	58	25
Maximum Daily Emissions	100	1,020	407	77	35
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-5, construction-related emissions of CO, PM₁₀, and PM_{2.5} would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, construction-generated ROG and NO_x emissions would exceed applicable mass emission thresholds. Therefore, **temporary construction emissions would have a significant impact to regional air quality under CEQA (Criterion B).**

The General Conformity Rule requires federal agencies to analyze proposed actions according to standardized procedures and to provide a public review and comment period. The conformity determination process is intended to demonstrate that the proposed federal action would not:

- cause or contribute to new violations of federal air quality standards,
- increase the frequency or severity of existing violations of federal air quality standards, and
- delay the timely attainment of federal air quality standards.

The process to evaluate General Conformity for a proposed federal action involves an applicability analysis, conformity determination, and review. According to EPA guidance, the federal agency must apply the applicability requirements found at 40 CFR Section 93.153(b) to the federal action to evaluate whether, on a pollutant-by-pollutant basis, a determination of General Conformity is required. The guidance states that the applicability analysis can be (but is not required to be) completed concurrently with analysis required under NEPA. If the regulating federal agency determines that the General Conformity regulations do not apply to the federal action, no further analysis or documentation is required.

Analysis required by the General Conformity Rule focuses on the net increase in emissions compared to ongoing historical conditions. Existing SIPs are presumed to have accounted for routine, ongoing federal agency activities. Conformity analyses are further limited to those direct and indirect emissions over which the federal agency has responsibility and control. General Conformity analyses are not required to analyze emissions sources that are beyond the responsibility and control of the federal agency. Conformity determinations are not required to address emissions that are not reasonably foreseeable or reasonably quantifiable.

The federal agency can also take measures to reduce emissions below *de minimis* levels; therefore, the General Conformity Rule would not apply to the proposed action. The changes must be state or federally enforceable to guarantee that emissions would be below *de minimis* levels. The proposed project assumes various air quality mitigation measures to meet CEQA requirements due to significant impacts that would occur based on the CEQA significance

thresholds. Based on CEQA provisions that mitigation measures be required in, or incorporated into, the project (14 CCR Section 15091[a][1]), Mitigation Measures AQ-1 through AQ-5 are considered design features of the proposed project for the purpose of the NEPA and General Conformity applicability analysis. This is not considered “mitigation” under the General Conformity Rule, because the rule does not apply to projects that are below *de minimis* levels. Table 3.11-6 summarizes the projected annual emissions associated with construction of Alternative 2A.

Table 3.11-6
Alternative 2A – Construction-Related NEPA/General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
2016					
Mobilization/Demobilization/Site Preparation	0.15	1.46	0.79	0.07	0.06
Construction Equipment/On-Road Vehicles	1.46	10.61	6.11	3.09	0.62
Dredging	3.77	35.02	15.57	1.26	1.16
Material Disposal	0.22	1.09	0.90	0.07	0.07
Total Annual Emissions	5.60	48.18	23.36	4.49	1.90
2017					
Construction Equipment/On-Road Vehicles	2.68	19.47	11.13	5.85	1.15
Dredging	7.07	65.67	29.19	2.36	2.17
Material Disposal	0.32	1.62	1.34	0.11	0.10
Total Annual Emissions	10.08	86.76	41.66	8.32	3.42
2018					
Construction Equipment/On-Road Vehicles	2.27	16.67	9.22	6.14	1.04
Dredging	7.25	67.35	29.94	2.42	2.22
Total Annual Emissions	9.52	84.02	39.17	8.56	3.27
2019					
Mobilization/Demobilization	0.09	0.94	0.49	0.04	0.03
Construction Equipment/On-Road Vehicles	0.80	8.48	3.63	2.19	0.37
Dredging	3.62	46.89	14.93	1.20	1.11
Total Annual Emissions	4.51	56.30	19.05	3.44	1.51
Maximum Annual Emissions ¹	10	87	42	8	3
<i>De minimis</i> Thresholds ²	100	100	100	100	100
Exceed <i>de minimis</i> Thresholds?	No	No	No	No	No

¹ Estimates include NO_x emission reductions associated with mitigation measures AQ-1 and AQ-2.

² *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_x, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants PM₁₀, and PM_{2.5}.

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-6, the estimated emissions associated with Alternative 2A are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with

Alternative 2A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Construction of the proposed project would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. PM exhaust emissions from diesel-fueled engines (diesel PM) were identified as a toxic air contaminant (TAC) by ARB in 1998 (ARB 1998). Generation of diesel PM from construction projects typically occurs in a single area for a short period. The variable nature of construction activity also affects the amount of time that equipment is typically within a distance that would expose sensitive receptors to substantial concentrations. Concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet (ARB 2005).

Sensitive receptors are located at varying distances from the project site. To the north, surrounding land uses include primarily residential development. Land uses bordering the lagoon to the south primarily consist of single-family residential development. An unincorporated area of San Diego County lies to the east of San Elijo Lagoon and consists of spaced rural development, primarily large estate homes. Residences are located as close as 300 feet from the proposed dredging area in the central basin, and as close as 2,000 feet from the proposed dredging area in the east basin.

Project construction would result in the generation of diesel PM emissions from the use of off-road diesel construction equipment required for vegetation clearing, dredging, and material disposal. Other construction-related sources of diesel PM are material delivery trucks and may include construction worker vehicles. However, not all construction worker vehicles would be diesel-fueled, and most diesel PM emissions associated with material delivery trucks and construction worker vehicles would occur off-site.

The dose of TACs is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure a person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period to a fixed amount of emissions results in a higher exposure level and higher health risks for the maximally exposed individual. According to the Office of Environmental Health Hazard Assessment's health risk assessments program (OEHHA 2003), which is used to determine the exposure of sensitive receptors to TAC emissions, risk should be based on a 70-year exposure period; however, such assessments can be limited to the period/duration of activities associated with the project.

The period of construction for the proposed project is approximately 3 years. Thus, if the maximum duration of potentially harmful construction activities near a sensitive receptor is 3

years, then the exposure would be approximately 4 percent of the total exposure period used for typical health risk calculations (i.e., 70 years). However, the distance at which off-road equipment would operate, and dredging and other activities would occur, near sensitive receptors would vary considerably during that time. Construction equipment would operate at a distance reasonably considered to have an effect on sensitive receptors (i.e., within 500 feet) for less time than the total period of the construction schedule.

Because the use of off-road heavy-duty diesel equipment would be temporary during the 3-year construction period and equipment would operate at varying distances from receptors, sensitive receptors would not be exposed to substantial construction-related emissions of TACs. Therefore, **construction-related TAC impacts to sensitive receptors associated with the proposed project would be less than significant under CEQA (Criterion C).**

CO concentration is a direct function of motor vehicle activity, particularly during peak commute hours, and certain meteorological conditions. Under specific meteorological conditions, CO concentrations may reach unhealthy levels with respect to local sensitive land uses, such as residential areas, schools, preschools, playgrounds, and hospitals. As a result, air districts typically recommend analysis of CO emissions at a local rather than a regional level. Many air districts have established preliminary screening criteria to determine if mobile-source emissions of CO would result in, or substantially contribute to, emissions concentrations that exceed the 1-hour ambient air quality standard of 20 parts per million (ppm) or the 8-hour standard of 9.0 ppm, respectively.

SDAPCD has not established screening criteria for CO hotspots, but the County of San Diego indicates that projects that cause road intersections to operate at or below LOS E with intersection peak-hour traffic volumes exceeding 3,000 vehicles could create a CO hotspot and result in a cumulatively considerable net increase of CO (County of San Diego 2007). According to the traffic study prepared for the proposed project, even with the addition of project traffic during the construction period, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better (LLG 2014).

The road along Coast Highway 101 across the mouth of the lagoon would be demolished and replaced with the proposed bridge. As discussed in Section 3.10, all roadway segments affected by the bridge lane closure would continue to operate at acceptable LOS C or better with the following exceptions:

- Coast Highway 101 – South of Chesterfield Drive, LOS E
- Lomas Santa Fe Drive – Solana Hills Drive to I-5, LOS F

Traffic volumes also affect the ability of a roadway or intersection to result in a CO hotspot. The CO hotspot analysis in the County of San Diego CEQA Air Quality guidelines (page 22) is based on information provided by the Sacramento Metropolitan Air Quality Management District (SMAQMD). If the project does not meet the LOS screening criteria, SMAQMD recommends that projects use the second tier of the screening criteria based on the roadway's traffic volumes. According to SMAQMD, a project would not result in localized CO impacts if the project would not cause an affected intersection to experience more than 31,600 vehicles per hour. The maximum hourly volumes at any of the roadway segments mentioned above would not exceed SMAQMD's screening threshold of 31,600 vehicles per hour.

Therefore, it is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

The human response to odors is extremely subjective, and sensitivity to odors varies greatly among the public. The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. While offensive odors rarely cause physical harm, they can be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Potential sources that may emit odors during construction activities include exhaust from diesel construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by diesel exhaust odors associated with project construction. Odors from these sources would be localized and generally confined to the immediate area surrounding the proposed project site. The proposed project would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Vegetation clearing and dredging could also result in odors associated with a high level of organic debris. However, while an odor may be noted, it would be typical of odor currently associated with low tide conditions in the area.

Therefore, the proposed project would not create objectionable odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

Permanent

As discussed earlier, project consistency is based on whether the proposed project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Monitoring and maintenance activities would occur annually, or as needed, and would require minor on-road trips associated with workers or mobilization of equipment. The proposed project would not require substantial daily on-road vehicle trips for continued project operations because it is a restoration project that would not involve facilities requiring intensive maintenance. This would require equipment delivery and limited worker trips for the dredge (which requires few workers). Therefore, the proposed project would not substantially increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of the proposed project would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with SDAPCD's RAQS. **The impact would be less than significant under CEQA (Criterion A).**

Maintenance requirements would be determined during the long-term monitoring program and may include, but are not limited to, inlet maintenance, maintenance dredging, plant removal and/or replacement, weed abatement, trash removal, and bank protection repair. The most intensive maintenance activities would involve maintenance dredging and would occur approximately every 3 to 4 years with the removal of 300,000 cy of material per maintenance cycle. The estimates of operational emissions are based on similar assumptions to those for construction emissions, as the primary sources of emissions would be similar to those used in the construction phase, including dredges, off-road equipment, and on-road motor vehicle trips related to workers. Emission factors were based on the earliest future year (e.g., 2020) that maintenance dredging activities would occur. Table 3.11-7 shows the projected emissions associated with operational and maintenance activities.

Table 3.11-7
Alternative 2A – CEQA Estimated Daily Operational and Maintenance Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Construction Equipment/On-Road Vehicles	9.29	76.84	43.49	2.65	2.37
Dredging	38.32	301.20	213.93	10.43	9.60
Total Daily Operational Emissions	47.61	378.04	257.42	13.09	11.97
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	No	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-7, operational emissions of ROG, CO, PM₁₀, and PM_{2.5} would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, NO_x emissions associated with maintenance activities would exceed the applicable mass emission threshold. Therefore, **operational emissions associated with Alternative 2A would have a significant impact to regional air quality under CEQA (Criterion B).**

The General Conformity Rule requires federal agencies to analyze proposed actions according to standardized procedures. Analysis required by the General Conformity Rule focuses on the net increase in emissions compared to ongoing historical conditions. Table 3.11-8 summarizes the projected annual emissions associated with operational and maintenance activities for Alternative 2A.

Table 3.11-8
Alternative 2A – Operational and Maintenance NEPA/General Conformity Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
2020					
Construction Equipment/On-Road Vehicles	0.64	5.38	3.02	0.18	0.16
Dredge	2.87	22.59	16.04	0.78	0.72
Total Annual Emissions	3.51	27.97	19.07	0.97	0.88
<i>De minimis</i> Thresholds ¹	100	100	100	100	100
Exceed <i>de minimis</i> Thresholds?	No	No	No	No	No

¹ *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_x, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_x, PM₁₀, and PM_{2.5}.

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-6, the estimated operation and maintenance emissions associated with Alternative 2A are less than the General Conformity *de minimis* thresholds. Therefore, operational emissions associated with Alternative 2A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to construction activities, maintenance activities for the proposed project would result in diesel exhaust emissions from on-site heavy-duty equipment. Maintenance activities for Alternative 2A would occur every 3 years for a period of 6 months. Because off-road heavy-duty diesel equipment would be used for a relatively short time period every 3 years, and because equipment would operate at varying distances, maintenance-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **operation and**

maintenance-related TAC impacts to sensitive receptors associated with the proposed project would be less than significant under CEQA (Criterion C).

As mentioned earlier, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better with implementation of the project alternatives. Therefore, it is not anticipated that operation of the proposed project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Operational emissions associated with maintenance activities, such as dredging, would include odors from exhaust from diesel equipment similar to construction activities. Infrequent maintenance worker trips would not be anticipated to generate or expose persons to substantial odor emissions. Therefore, the proposed project would not create objectionable odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

Alternative 1B

Temporary

Similar to the proposed project, construction of Alternative 1B would primarily involve dredging and off-road equipment operations. Alternative 1B would not develop any land uses (e.g., residential or commercial) that would increase activities and/or emissions associated with on-road mobile sources. The use of construction equipment in the RAQS is estimated for the region on an annual basis, and construction-related emissions are estimated as an aggregate in the RAQS. Alternative 1B would not increase the assumptions for off-road equipment use in the RAQS. On-road trip generation would also occur during construction of Alternative 1B. Since this would only occur for the duration of the construction period, Alternative 1B would not substantially increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1B would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **This impact would be less than significant under CEQA (Criterion A).**

Construction of Alternative 1B would be essentially the same as that for Alternative 2A, with the exception of the components of the tidal inlet, a new Coast Highway 101 bridge, and roadway approaches. As shown in Table 3.11-9, construction emissions for Alternative 1B would result in maximum daily emissions of approximately 87 pounds of ROG, 861 pounds of NO_x, 355 pounds

of CO, 71 pounds of PM₁₀, and 29 pounds of PM_{2.5} for infrastructure and the initial export of 1.4 mcg of material. This conservative estimate of maximum daily emissions would not exceed South Coast Air Quality Management District (SCAQMD) construction thresholds of significance. Additional modeling assumptions and details are provided in Appendix K.

As shown in Table 3.11-9, construction-related emissions of CO, PM₁₀, and PM_{2.5} would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, construction-generated ROG and NO_x emissions would exceed applicable mass emission thresholds. Therefore, **temporary construction emissions would have a significant impact to regional air quality under CEQA (Criterion B).**

**Table 3.11-9
Alternative 1B – CEQA Estimated Daily Construction Emissions**

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Phase 1					
Mobilization/Demobilization/Site Preparation	8	70	39	3	3
Construction Equipment/On-Road Vehicles	26	297	103	50	11
Dredging	48	448	199	16	15
Material Disposal	13	116	52	4	4
Phase 1 – Maximum Daily Emissions	87	861	355	71	29
Phase 2					
Construction Equipment/On-Road Vehicles	30	305	108	54	11
Dredging	48	448	199	16	15
Phase 2 – Maximum Daily Emissions	78	753	307	70	26
Phase 3					
Construction Equipment/On-Road Vehicles	30	305	108	54	11
Dredging	48	448	199	16	15
Phase 3 – Maximum Daily Emissions	78	753	307	70	26
Phase 4					
Mobilization/Demobilization	2	26	14	1	1
Construction Equipment/On-Road Vehicles	26	251	95	40	10
Dredging	48	448	199	16	15
Phase 4 – Maximum Daily Emissions	76	725	308	58	25
Maximum Daily Emissions	87	861	355	71	29
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

Table 3.11-10 summarizes the projected annual emissions associated with construction of Alternative 1B.

Table 3.11-10
Alternative 1B – Construction-Related NEPA/General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
2016					
Mobilization/Demobilization/Site Preparation	0.15	1.46	0.79	0.07	0.06
Construction Equipment/On-Road Vehicles	1.36	9.84	5.73	3.05	0.58
Dredging	3.77	35.02	15.57	1.26	1.16
Material Disposal	0.22	1.09	0.90	0.07	0.07
Total Annual Emissions	5.51	47.41	22.98	4.44	1.86
2017					
Construction Equipment/On-Road Vehicles	2.48	17.78	10.31	5.76	1.07
Dredging	7.07	65.67	29.19	2.36	2.17
Material Disposal	0.32	1.62	1.34	0.11	0.10
Total Annual Emissions	9.88	85.07	40.84	8.22	3.34
2018					
Construction Equipment/On-Road Vehicles	2.20	14.88	8.65	6.06	0.99
Dredging	7.25	67.35	29.94	2.42	2.22
Total Annual Emissions	9.45	82.23	38.60	8.48	3.22
2019					
Mobilization/Demobilization/Site Preparation	0.09	0.94	0.49	0.04	0.03
Construction Equipment/On-Road Vehicles	1.04	9.55	4.10	2.26	0.43
Dredging	3.62	46.89	14.93	1.20	1.11
Total Annual Emissions	4.74	57.38	19.52	3.50	1.58
Maximum Annual Emissions ¹	10	85	41	8	3
<i>De minimis</i> Thresholds ²	100	100	100	100	100
Exceed <i>de minimis</i> Thresholds?	No	No	No	No	No

¹ Estimates include NO_x emission reductions associated with mitigation measures AQ-1 and AQ-2.

² *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_x, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants PM₁₀, and PM_{2.5}.

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-10, the estimated annual emissions associated with Alternative 1B are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1B would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse effects would occur under NEPA.**

Similar to Alternative 2A, construction activities for Alternative 1B would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, sensitive receptors would not be exposed to substantial construction-related emissions of TACs. Therefore, **construction-related TAC impacts to sensitive receptors associated with Alternative 1B would be less than significant under CEQA (Criterion C).**

Similar to Alternative 2A, even with the addition of project traffic during the construction period, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better (LLG 2014). Since Alternative 1B would not cause road intersections or roadway segments to operate at or below LOS E, it is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Construction of Alternative 1B would not include a new tidal inlet or a new Coast Highway 101 bridge with roadway approaches. As mentioned earlier, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better with implementation of the project alternatives. It is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Similar to Alternative 2A, potential sources that may emit odors during construction activities for Alternative 1B include exhaust from diesel construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by diesel exhaust odors associated with project construction. Odors from these sources would be localized and generally confined to the immediate area surrounding the project site. Alternative 1B would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Vegetation clearing and dredging could also result in odors associated with a high level of organic debris. However, while an odor may be noted, it would be typical of odor currently associated with low tide conditions in the area. Therefore, **Alternative 1B would not create objectionable odors affecting a substantial number of people and impacts would be less than significant under CEQA (Criterion D).**

Permanent

As discussed earlier, project consistency is based on whether Alternative 1B would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Monitoring and maintenance activities would occur annually, or as needed, and would require minor on-road trips associated with workers or mobilization of equipment due to limited locations and activities anticipated for maintenance, as described in Section 2.10. Alternative 1B would not require significant daily on-road vehicle trips for continued project operations. Haul trips would not utilize public roadways, and traffic generated from maintenance activities would be limited to

worker trips. Therefore, Alternative 1B would not significantly increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1B would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with SDAPCD's RAQS. **The impact would be less than significant under CEQA (Criterion A).**

Maintenance requirements would be determined during the long-term monitoring program and may include, but are not limited to, remedial dredging, plant replacement, weed abatement, trash removal, and bank protection repair. The most intensive maintenance activities would involve inlet maintenance and would occur annually for approximately 4 weeks with the removal of 40,000 cy of material per year by mechanical equipment (not a dredge). The estimates of operational emissions are based on similar assumptions to those for construction emissions, as the primary sources of emissions would be similar to those used in the construction phase, including off-road equipment and on-road motor vehicle trips related to workers. Table 3.11-11 shows the projected emissions associated with operational and maintenance activities.

Table 3.11-11
Alternative 1B – CEQA Estimated Daily Operational and Maintenance Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Construction Equipment/On-Road Vehicles	4.66	30.25	19.34	1.17	1.04
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	No	No	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-11, operational emissions of ROG, NO_x, CO, PM₁₀, and PM_{2.5} would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. Therefore, **operational emissions would have a less than significant direct impact to regional air quality under CEQA (Criterion B).**

Table 3.11-12 summarizes the projected annual emissions associated with construction of Alternative 1B.

Table 3.11-12
Alternative 1B – Operational and Maintenance NEPA/
General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Annual Construction Equipment/On-Road Vehicle Emissions	0.07	0.45	0.29	0.02	0.02
<i>De minimis</i> Thresholds ¹	100	100	100	100	100
Exceed <i>de minimis</i> Thresholds?	No	No	No	No	No

¹ *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_x, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_x, PM₁₀, and PM_{2.5}.

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-12, the estimated annual emissions associated with Alternative 1B are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1B would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to construction activities, operation and maintenance activities for Alternative 1B would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, maintenance-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **operation and maintenance-related TAC impacts to sensitive receptors associated with Alternative 1B would be less than significant under CEQA (Criterion C).**

Operation and maintenance of Alternative 1B would not cause road intersections to operate at or below LOS E. Therefore, it is not anticipated that operation of Alternative 1B would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Operational emissions associated with maintenance activities would include odors from exhaust from diesel equipment similar to construction activities. Infrequent maintenance worker trips would not be anticipated to generate or expose persons to substantial odor emissions. Therefore, **Alternative 1B would not create objectionable odors affecting a substantial number of people and impacts would be less than significant under CEQA (Criterion D).**

Alternative 1A**Temporary**

Similar to the proposed project, construction of Alternative 1A would primarily involve dredging and off-road equipment operations. Alternative 1A would not develop any land uses (e.g., residential or commercial) that would increase activities and/or emissions associated with on-road mobile sources. The use of construction equipment in the RAQS is estimated for the region on an annual basis, and construction-related emissions are estimated as an aggregate in the RAQS. Alternative 1A would not increase the assumptions for off-road equipment use in the RAQS. On-road trip generation would also occur during construction of Alternative 1A. Alternative 1A would result in a maximum trip generation of 120 light-duty vehicle and 89 heavy-duty truck trips per day during the construction period. Since this would only occur for the duration of the construction period, Alternative 1A would not significantly increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1A would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **This impact would be less than significant under CEQA (Criterion A).**

Construction of Alternative 1A would be different from the other alternatives, but less complicated since it does not involve widespread dredging within the lagoon or require temporary dike construction or phasing. Similar to Alternative 1B, Alternative 1A does not include the components of the tidal inlet, a new Coast Highway 101 bridge, or roadway approaches. As shown in Table 3.11-13, construction emissions for Alternative 1A would result in maximum daily emissions of approximately 112 pounds of ROG, 1,076 pounds of NO_x, 462 pounds of CO, 80 pounds of PM₁₀, and 37 pounds of PM_{2.5} for the initial export of 160,000 cy of material by dredging equipment. Besides the difference in the volume and frequency of export for construction materials between Alternate 1A and 1B, the distance to the material disposal location at LA-5 would result in added emissions for Alternate 1A. Additional modeling assumptions and details are provided in Appendix K.

As shown in Table 3.11-13, construction-related emissions of CO, PM₁₀, and PM_{2.5} would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, construction-generated ROG and NO_x emissions would exceed applicable mass emission thresholds. Therefore, **temporary construction emissions would have a significant impact to regional air quality under CEQA (Criterion B).**

Table 3.11-13
Alternative 1A – CEQA Estimated Daily Construction Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Phase 1	92	470	760	30	28
Mobilization/Demobilization/Site Preparation	8	70	39	3	3
Construction Equipment/On-Road Vehicles	23	280	97	51	10
Dredging	19	166	79	6	5
Material Disposal	69	630	286	23	21
Phase 1 – Maximum Daily Emissions	112	1,076	462	80	37
Phase 2	23	280	97	51	10
Mobilization/Demobilization	2	26	14	1	1
Construction Equipment/On-Road Vehicles	18	191	70	29	7
Dredging	19	166	79	6	5
Phase 2 – Maximum Daily Emissions	39	383	163	36	13
Maximum Daily Emissions	112	1,076	462	80	37
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

Table 3.11-14 summarizes the projected annual emissions associated with construction of Alternative 1A. As shown in Table 3.11-14, the estimated emissions associated with Alternative 1A are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to Alternative 2A, construction activities for Alternative 1A would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. However, construction would occur for an even shorter period of time and exposure of sensitive receptors to TAC emissions would be less than 1 percent of the total exposure period used for typical health risk calculations (i.e., 70 years). Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, construction-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **construction-related TAC impacts to sensitive receptors associated with Alternative 1A would be less than significant under CEQA (Criterion C).**

Table 3.11-14
Alternative 1A – Construction-Related NEPA/General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
2016/2017					
Mobilization/Demobilization/Site Preparation	0.15	1.46	0.79	0.07	0.06
Construction Equipment/On-Road Vehicles	1.36	10.33	5.58	2.77	0.58
Dredging	1.29	11.22	5.34	0.39	0.36
Material Disposal	0.55	2.77	2.28	0.19	0.17
Total Annual Emissions	3.35	25.79	13.99	3.41	1.16
2018					
Mobilization/Demobilization	0.09	0.94	0.49	0.04	0.03
Construction Equipment/On-Road Vehicles	0.53	3.89	2.24	1.03	0.22
Dredging	0.64	5.61	2.67	0.19	0.18
Material Disposal	0.28	1.39	1.14	0.09	0.09
Total Annual Emissions	1.54	11.82	6.54	1.36	0.52
Maximum Annual Emissions ¹	3.3	26	14	3	1
<i>De minimis</i> Thresholds ²	100	100	100	100	100
Exceed <i>de minimis</i> Thresholds?	No	No	No	No	No

¹ Estimates include NO_x emission reductions associated with mitigation measures AQ-1 and AQ-2.

² *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_x, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants PM₁₀, and PM_{2.5}.

Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A and Alternative 1B, even with the addition of project traffic during the construction period, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better (LLG 2014). Since Alternative 1A would not cause road intersections to operate at or below LOS E, it is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Similar to Alternative 2A, potential sources that may emit odors during construction activities for Alternative 1A include exhaust from diesel construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by diesel exhaust odors associated with project construction. Odors from these sources would be localized and generally confined to the immediate area surrounding the project site. Alternative 1A would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Vegetation clearing and dredging could also result in odors associated with a high level of organic debris. However, while an odor may be noted, it would be similar to existing low tide conditions and would not be atypical for the area. Therefore, Alternative 1A would not create objectionable

odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

Permanent

As discussed earlier, project consistency is based on whether the project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Monitoring and maintenance activities would occur annually, or as needed, and would require minor on-road trips associated with workers or mobilization of equipment. Alternative 1A would not require significant daily on-road vehicle trips for continued project operations. Haul trips would not utilize public roadways, and traffic generated from maintenance activities would be limited to worker trips. Therefore, Alternative 1A would not significantly increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1A would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **The direct and indirect impacts would be less than significant under CEQA (Criterion A).**

Maintenance requirements would be determined during the long-term monitoring program and may include, but are not limited to, remedial dredging, plant replacement, weed abatement, trash removal, and bank protection repair. The most intensive maintenance activities would occur annually for approximately 3 weeks and would involve inlet maintenance with the removal of 35,000 cy of material per year by land-based mechanical equipment (not a dredge). The estimates of operational emissions are based on similar assumptions to those for construction emissions, as the primary sources of emissions would be similar to those used in the construction phase, including off-road equipment and on-road motor vehicle trips related to workers. Table 3.11-15 shows the projected emissions associated with operational and maintenance activities.

Table 3.11-15
Alternative 1A – CEQA Estimated Daily Operational and Maintenance Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Construction Equipment/On-Road Vehicles	4.66	30.25	19.34	1.17	1.04
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	No	No	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-15, operational emissions of ROG, NO_x, CO, PM₁₀, and PM_{2.5} would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. **Therefore, operational**

emissions would have a less than significant impact to regional air quality under CEQA (Criterion B).

Table 3.11-16 summarizes the projected annual emissions associated with construction of Alternative 1A.

Table 3.11-16
Alternative 1A – Operations and Maintenance NEPA/
General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Annual Construction Equipment/On-Road Vehicle Emissions	0.06	0.39	0.25	0.02	0.01
<i>De minimis</i> Thresholds ¹	100	100	100	100	100
Exceed <i>de minimis</i> Thresholds?	No	No	No	No	No

¹ *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_x, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_x, PM₁₀, and PM_{2.5}.

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-16, the estimated annual emissions associated with Alternative 1A are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to construction activities, operation and maintenance activities for Alternative 1A would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, maintenance-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **operation and maintenance-related TAC impacts to sensitive receptors associated with Alternative 1A would be less than significant under CEQA (Criterion C).**

As mentioned earlier, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better with implementation of the project alternatives. Therefore, it is not anticipated that operation of Alternative 1A would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Operational emissions associated with maintenance activities would include odors from exhaust from diesel equipment similar to construction activities. Infrequent maintenance worker trips would not be anticipated to generate or expose persons to substantial odor emissions. Therefore, Alternative 1A would not create objectionable odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would result in continued periodic maintenance at the project site and would therefore result in continued periodic emissions. Currently, management of the lagoon involves mechanical excavation to maintain an open inlet condition, as funding allows. Under this alternative, no dredging or excavation would occur to improve tidal circulation, channel clearing, or other comprehensive actions to improve tidal exchange or upstream flooding. The lagoon inlet would remain in its existing location.

Since there is no increase in activities under the No Project/No Federal Action Alternative, emissions would also not increase. Therefore, **emissions associated with the No Project/No Federal Action Alternative would be less than significant under CEQA (Criteria A, B, C, and D).**

3.11.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Under NEPA, estimated emissions associated with each of the alternatives are less than the General Conformity *de minimis* thresholds. No substantial adverse direct or indirect effects have been identified, so the project design features and additional measures below are considered avoidance and/or minimization measures under NEPA.

Construction-related emissions would exceed the recommended levels of significance for ROG and NO_x for Alternative 2A, Alternative 1B, and Alternative 1A, and construction activities could lead to a violation of an applicable air quality standard under CEQA (Criterion B for temporary and permanent conditions). Implementation of mitigation measures would address potential violations of air quality standards as a result of construction-related activities associated with construction of Alternative 2A, Alternative 1B, and Alternative 1A. To ensure that fugitive dust emissions do not exceed the applicable thresholds of significance for PM₁₀ and PM_{2.5}, the County of San Diego also recommends typical design considerations that may be incorporated into projects to avoid air quality impacts. Project design features include measures to reduce criteria pollutant emissions, including requirements to maintain equipment and vehicles, minimizing idling time, and using appropriately sized engines to support the required scope of

work. To reduce construction-related criteria pollutant emissions, Alternative 2A, Alternative 1B, and Alternative 1A shall implement the following mitigation measures for the duration of the construction period:

- AQ-1 Off-road construction diesel engines not registered under ARB's Statewide Portable Equipment Registration Program that have a rating of 50 horsepower (hp) or more, shall meet, at a minimum, the Tier 3 California Emissions Standards, unless such an engine is not available for a particular item of equipment. Tier 2 engines will be allowed on a case-by-case basis when the Contractor has documented that no Tier 3 equipment or emissions equivalent retrofit equipment is available for a particular equipment type that must be used to complete construction. Documentation shall consist of signed written statements from at least two construction equipment rental firms.
- AQ-2 Harbor craft with a Category 1 or 2 marine engine, such as tugboats used for material disposal, shall meet, at a minimum, EPA Tier 2 marine engine emission standards.
- AQ-3 Dredging equipment shall be electric, if determined by the contractor to be feasible, based on availability and cost.
- AQ-4 Contractors shall use alternative fueled (e.g., compressed natural gas [CNG], liquefied natural gas [LNG], propane), or electric-powered construction equipment, if determined by the contractor to be feasible, based on availability and cost.
- AQ-5 The following measures shall be implemented by the construction contractor to reduce fugitive dust emissions associated with off-road equipment and heavy-duty vehicles:
- Exposed surfaces (e.g., unpaved access roads) shall be watered, as necessary, to control fugitive dust.
 - Sweepers and water trucks shall be used to control dust and debris at public street access points.
 - Dirt storage piles shall be stabilized by chemical binders, tarps, fencing, or other suppression measures.
 - Provide sufficient perimeter erosion control to prevent washout of silty material onto public roads.

- Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling.
- Enforce a 15-mph speed limit on unpaved surfaces.

CEQA Mitigation Measure AQ-1 requires engines in diesel-fueled construction equipment above 50 hp to meet Tier 3 emission standards. Emission standards for diesel off-road equipment are based on the engine model year. Implementation of these standards, referred to as Tier 1 emission standards, became effective in 1996. The more stringent Tier 2 and Tier 3 emission standards became effective between 2001 and 2008, with the effective date dependent on engine horsepower. The OFFROAD model used in the analysis contains ranges of tier engines and uses average fleet data to develop emission factors for a given calendar year. Because the earliest year for project construction would be 2016 and the requirements for production of Tier 2 engines have been in effect for over 10 years, it is reasonable to assume that most, if not all, offroad construction equipment would meet Tier 2 emission standards without the application of CEQA Mitigation Measure AQ-1. Based on the improvements in emissions standards required by ARB, the analysis assumes that using off-road construction equipment with Tier 3 engines would result in an additional 38 percent reduction in both ROG and NO_x emissions from the use of Tier 2 equipment (SCAQMD 2014a). Mitigation Measure AQ-1 would achieve an even greater reduction in emissions compared to the use of equipment with Tier 1 engine standards.

CEQA Mitigation Measure AQ-2 addresses marine vehicle engines and would require the use of tugboats that meet Tier 2 marine engine standards and would result in at least a 45 percent reduction in both ROG and NO_x emissions (SCAQMD 2014b). The use of electric dredging equipment, if feasible, would reduce ROG and NO_x emissions associated with dredging activities.

The estimated reductions in daily criteria pollutant emissions achieved by CEQA Mitigation Measures AQ-1 and AQ-2 were estimated by multiplying unmitigated peak daily emissions by the percentages discussed above. Table 3.11-17 shows the mitigated construction emissions for the project alternatives.

Table 3.11-17
Mitigated Daily Construction Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}
Alternative 2A	81	837	407	77	35
Alternative 1B	72	711	355	71	29
Alternative 1A	72	702	462	80	37
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

The mitigated emissions shown in Table 3.11-17 include reductions associated with CEQA Mitigation Measures AQ-1 and AQ-2. Emission reductions associated with CEQA Mitigation Measures AQ-3 and AQ-4 would be dependent on implementation and were not quantified for this analysis.

3.11.5 LEVEL OF IMPACT AFTER MITIGATION

Implementation of Mitigation Measures AQ-1 through AQ-5 would ensure construction activities associated with the project would reduce criteria pollutant emissions.

CEQA: As shown in Table 3.11-17, the mitigated ROG emissions for Alternative 2A would continue to exceed the applicable significance thresholds. Mitigation Measures AQ-1 and AQ-2 would reduce ROG emissions associated with Alternative 1B and Alternative 1A to a less than significant level. Even with implementation of Mitigation Measures AQ-1 and AQ-2 discussed above, construction-related NO_x emissions for the project alternatives would continue to exceed the threshold of significance.

As discussed above, the use of electric dredging equipment was not quantified for this analysis. Mitigation Measure AQ-3 could reduce ROG emissions for the project alternatives to a less than significant level. However, even with the use of electric dredging equipment as discussed in Mitigation Measure AQ-3, NO_x emissions for the project alternatives would continue to exceed the threshold of significance because vehicular traffic alone would exceed the threshold. Therefore, construction activities for Alternative 2A, Alternative 1B, and Alternative 1A could lead to a violation of an applicable air quality standard. This impact would remain significant and unavoidable.

As discussed earlier in this section, PM₁₀ and PM_{2.5} emissions for the project alternatives would not exceed the applicable thresholds of significance. Implementation of CEQA Mitigation Measure AQ-5 would ensure that PM₁₀ and PM_{2.5} emissions would be less than significant.

NEPA: The estimated annual emissions for the project alternatives would not exceed the *de minimis* thresholds. Therefore, no substantial adverse direct or indirect effects would occur.

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3.12 NOISE

This section explains noise and vibration terminology and concepts; describes existing noise levels in the SELRP areas; and identifies sensitive receptors in the surrounding communities. Project impacts are then identified and evaluated in light of applicable noise regulations, which are described in Appendix C. Noise impacts to sensitive species are addressed in Section 3.6 Biological Resources.

Supporting technical information for this lagoon restoration element is provided in Appendix L. The analysis of noise related to materials placement is largely from the 2012 RBSP EA/EIR (SANDAG 2011).

3.12.1 AFFECTED ENVIRONMENT

Noise Terminology

Sound is a vibratory disturbance created by a moving or vibrating source that is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment.

In its most basic form, a continuous sound can be described by its frequency or wavelength (pitch) and its amplitude (loudness). Frequency is expressed in cycles per second, or hertz. Frequencies are heard as the pitch or tone of sound. High-pitched sounds produce high frequencies; low-pitched sounds produce low frequencies. The amplitude of pressure waves generated by a sound source determines the loudness of that source, typically expressed as sound-pressure levels, described in units of decibels (dB).

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this, the A-scale, which approximates the frequency response of the average young ear when listening to most everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate with the A-scale sound levels of those sounds. Therefore, the “A-weighted” noise scale is used for measurements and standards involving the human perception of noise. Noise levels using A-weighted measurements are written dB(A) or dBA.

Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubling of traffic volume, would increase the noise level by 3 dB; a halving of

the energy would result in a 3 dB decrease. It is widely accepted that the trained ear, however, can barely perceive noise level changes of 3 dBA (Caltrans 2009).

Table 3.12-1 shows the relationship of various noise levels to commonly experienced noise events.

Table 3.12-1
Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet	— 100 —	
Gas lawn mower at 3 feet	— 90 —	
Diesel truck at 50 feet at 50 mph	— 80 —	Food blender at 3 feet Garbage receptor at 3 feet
Noisy urban area, daytime	— 70 —	Vacuum cleaner at 10 feet Normal speech at 3 feet
Gas lawn mower, 100 feet	— 60 —	
Commercial area	— 50 —	Large business office Dishwasher next room
Heavy traffic at 300 feet	— 40 —	Theater, large conference room (background)
Quiet urban daytime	— 30 —	Library Bedroom at night
Quiet urban nighttime	— 20 —	
Quiet suburban nighttime	— 10 —	Broadcast/recording studio
Quiet rural nighttime	— 0 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 2009

Noise Descriptors

Several rating scales (or noise “metrics”) exist to analyze adverse effects of noise on a community. These scales include the equivalent noise level (L_{eq}), the day/night average sound level (DNL or L_{dn}), and the community noise equivalent level (CNEL). Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq} , meaning the equivalent noise level for that period of time. The period of time averaging may be specified; $L_{eq(8)}$ would be a 8-hour average. When no period is specified, a 1-hour average is assumed. It is important to understand that noise of short duration, that is, time substantially less than the averaging period, is averaged into ambient noise during the averaging period. Thus, a loud noise lasting many

seconds or a few minutes may have minimal effect on the measured sound level averaged over a 1-hour period. To evaluate community noise impacts, the descriptor (CNEL) was developed to account for human sensitivity to nighttime noise. CNEL represents the 24-hour average sound level, with a 5 dB penalty for noise occurring during the evening and a 10 dB penalty for noise occurring at night.

Vibration Descriptors

Typical outdoor sources of perceptible ground-borne vibration and noise are construction equipment and traffic on rough roads. Construction activity can also result in varying degrees of ground-borne vibration, depending on the type of equipment, methods employed, and site geology.

Ground vibrations from construction activities do not often reach levels that can damage structures, but they can be noticeable in buildings close to construction activities. Structural damage due to vibration is assessed in terms of peak particle velocity (PPV) and expressed in units of inches per second (in/sec).

The rumbling sound caused by the vibration of built features is ground-borne noise, and is generally related to root mean square velocity levels expressed in vibration decibels (VdB). In contrast to airborne noise, ground-borne noise is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 VdB or lower, which is well below the threshold of perception for humans of approximately 65 VdB.

Noise-Sensitive Receptors

Noise-sensitive receptors are generally considered humans engaged in activities, or utilizing land uses, that may be subject to stress of substantial interference from noise. Activities usually associated with sensitive receptors include, but are not limited to, studying, convalescence, and sleeping. Land uses often associated with sensitive receptors include residential dwellings, hotels and motels, hospitals, nursing residences, education facilities, and libraries.

The existing noise environment in this section highlights the noise-sensitive uses that would be exposed to noise sources with implementation of the proposed project. These receptors are located near the lagoon and adjacent to the materials placement sites (see Table 3.12-2). This section focuses on noise-sensitive receptors, as described above, and not all land uses. Specific adjacent land uses for each materials placement site are described in Section 3.1 Land Use/Recreation.

Table 3.12-2
Overview of Activities and Noise-Sensitive Receptors by Basin

Basin	Proposed Activity	Nearest Noise-Sensitive Receptors (1,000 feet or less)
Coastal	Construction of new inlet south of the existing feature; construction of cobble blocking features	Homes on West Circle Drive; overnight campers at San Elijo State Beach
West	Creation of new subtidal basin just landward of the new inlet; demolition of existing Coast Highway 101 roadway; construction of a new Coast Highway 101 bridge at new inlet location; deepening of channels under Coast Highway 101 bridges; construction of armor slopes at bridge base with rock	Homes on West Circle Drive, Solana Point Circle, and San Elijo Avenue
Central	Creation of new subtidal basin just landward of the new inlet	Homes on West Circle Drive, Solana Point Circle, North Rios Avenue, and San Elijo Avenue
	Clearing, grubbing, and haul-off of vegetation	Homes along Manchester Avenue
	Widening and redirecting main tidal channel just west of Interstate 5 extending into east basin	Homes along Manchester Avenue: Cape Sebastian Place, Camino Ocean Cove, Ocean Cove Drive, and MacKinnon Ranch Road
	Over-excavation of proposed overdredge pit	Homes along Solana Point Circle, North Rios Avenue, Gibson Point, Barbara Avenue, and North Granados Avenue
	Construction of access road at north end of North Rios Avenue	Homes along Solana Point Circle and North Rios Avenue
East	Widening and redirecting main tidal channel just west of Interstate 5 extending into east basin	Homes along Santa Inez and Santa Hidalgo
	Widening of existing channel in east basin and removing existing weir	Homes along Santa Inez and Santa Hidalgo

Vibration-Sensitive Receptors

Vibration-sensitive receptors are generally considered humans engaged in activities, or utilizing land uses, that may be subject to substantial interference from vibration. Activities and land uses often associated with vibration-sensitive receptors (i.e., structures and humans in proximity) are similar to those associated with noise-sensitive receptors (Table 3.12-2).

Existing Noise Environment

San Elijo Lagoon. The lagoon area is surrounded by a predominantly urban/suburban environment. The primary noise source within the area is transportation noise; other adjacent land uses that generate noise include:

- Vehicular traffic on Coast Highway 101 and I-5
- Railroad noise and aircraft over-flights
- San Elijo Joint Powers Authority Wastewater Plant

- Retail and restaurant land uses
- Commercial and residential landscape maintenance
- Schools (Solana Vista Elementary School, Encinitas Country Day School, and the Mira Costa College Campus)
- Churches (North Coast Presbyterian Church, and Saint Constantine and Helen Greek Orthodox Church)

Vehicles traveling on local roadways, landscaping equipment, and recreational activities generate noise levels that typically range from 55 to 90 dBA at 50 feet from the source. As part of the Draft General Plan Update, the City of Encinitas has prepared noise contours for I-5, Coast Highway 101, and the NCTD rail line within the lagoon study area (City of Encinitas 2010). As shown in Figure 3.12-1, noise levels range from 80 dBA CNEL in the vicinity of I-5 to 55 dBA CNEL in the eastern end of the lagoon. Noise levels between I-5 and Coast Highway 101 range from 80 to 60 dBA CNEL, with higher noise levels occurring closer to I-5 and Coast Highway 101 and the adjacent NCTD railroad. Noise levels at the beach in northern San Diego are typically close to 70 dBA due to wave activity (SANDAG 2011).

The NCTD rail line runs adjacent to Coast Highway 101 in the west part of San Elijo Lagoon and is utilized by Burlington Northern Santa Fe Railway (BNSF) freight trains, Amtrak passenger trains, and NCTD commuter trains (“The Coaster”). Existing noise levels in the vicinity of San Elijo Lagoon due to rail activities currently reach up to 76 dBA CNEL at homes nearest the rail line.

To further document the existing noise environment and to establish baseline ambient noise levels, noise measurements were taken. One long-term (24 hours) and six short-term (20 minutes) noise measurements were taken using an ANSI Level 1 Larson-Davis 820 sound level meter on November 20 and 21, 2012. A 20-minute sample is considered a “snapshot” of the baseline noise environment at a given time; the sound level may vary depending on time, day, or season. Noise measurement locations are shown in Figure 3.12-1, and corresponding ambient long- and short-term noise levels can be found in Table 3.12-3. Short-term noise measurements ranged from 47.0 to 65.4 dBA L_{eq} . Vehicle noise on I-5 and Coast Highway 101 dominated the noise environment. The long-term measurement resulted in a CNEL of 61 dBA. Noise monitoring field data sheets output sheets are included in Appendix L.

Table 3.12-3
Ambient Noise Measurements – San Elijo Lagoon

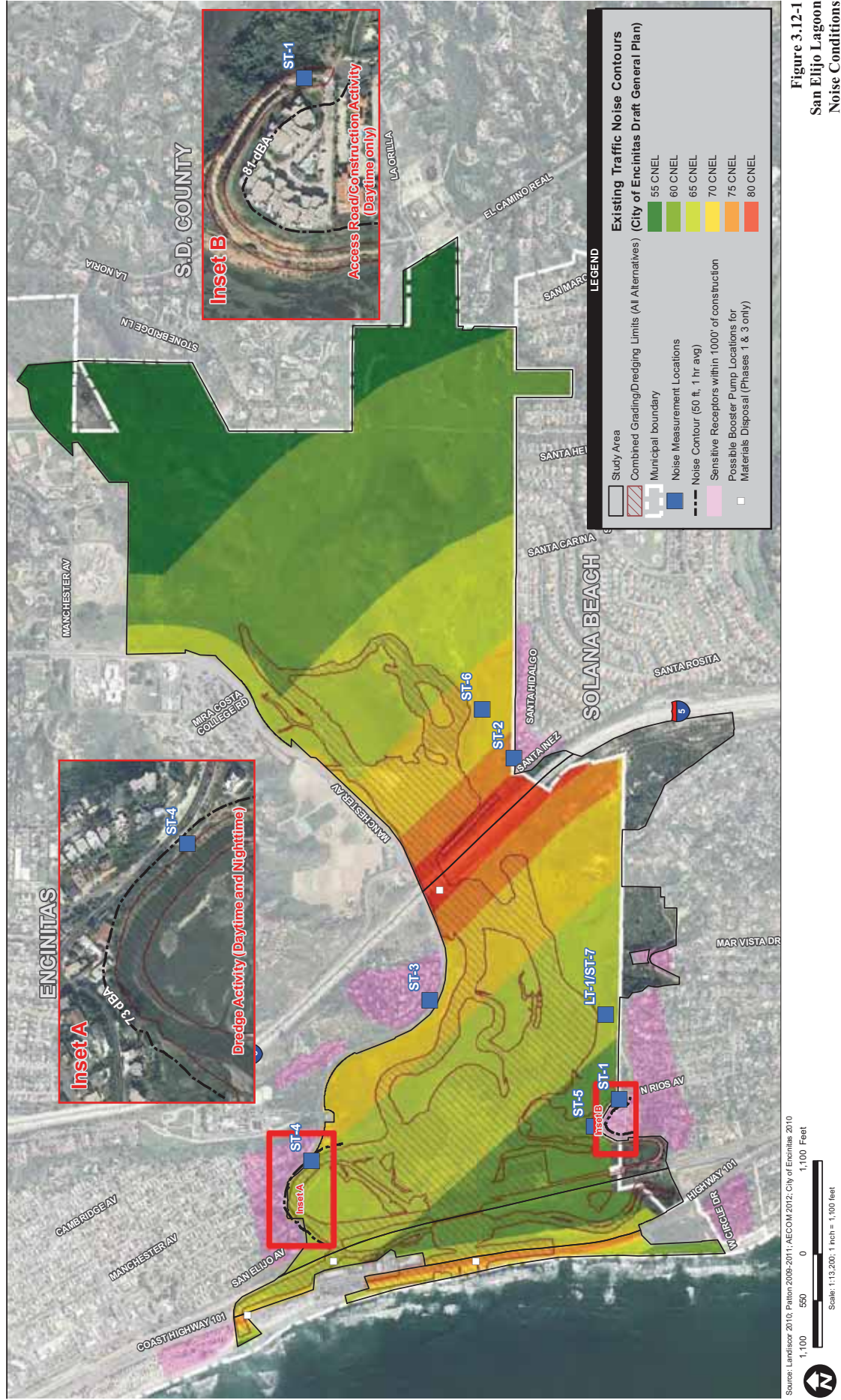
Noise Measurement #	L_{eq}	L_{max}
ST 1	50.6	65.7
ST 2	63.8	80.1
ST 3	48.6	60.7
ST 4	65.4	86.7
ST 5	53.2	58.2
ST 6	47.0	63.6
LT 1	61 dBA CNEL	n/a

ST = Short term

LT = Long term

Material Placement/Reuse Sites. Ambient noise measurements previously taken in support of the 2012 RBSP (SANDAG 2011) are representative for each of the proposed onshore materials placement sites. The principal source of noise at onshore materials placement sites is surf activity of the ocean, primarily breaking waves and the interaction of water, rocks, and sand in the surf area. Noise levels vary with the tide, wave height, and sand-rock composition, but in general onshore materials placement sites have relatively high background noise levels due to constant surf activity. This is typical of a beach environment. The proposed beach placement sites are also open to the public and have frequent recreational users and special events that generate noise, particularly during the warmer months. At night, noise generated by people using the beach decreases, but the primary source of noise from wave activity continues at the same levels as during the daytime. The measured noise levels, and additional noise sources associated with the individual materials placement sites, are described in Table 3.12-4. Figures 2-11A through 2-11E illustrate beach placement sites relative to adjacent coastal land uses.

There are no noise measurements at the offshore sites (LA-5 and SO-5/SO-6) because these sites are located a minimum of 0.5 mile from the coast and do not have sensitive receptors in proximity. Noise sources in the vicinity of offshore materials placement sites are primarily weather- and ocean-related but can also include aircraft over-flights, and military, commercial and pleasure-related boating activities.



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Table 3.12-4
Existing Noise Environment at Sand Placement Sites

Sand Placement Site	Noise Sources	Ambient Noise Level (L_{eq})	Nearby Sensitive Noise Receptors
Moonlight Beach	Ocean wave noise, residential and commercial landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Beach – 70 dBA. Nighttime noise at residences close to the beach – 67 to 68 dBA.	Single- and multi-family residences adjacent to the north end of the beach. The southernmost house is beach level, with a porch adjacent to the materials placement site.
Leucadia	Ocean wave noise, residential landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Residences above the beach – 63 to 66 dBA (nighttime). Materials placement site location 25 feet west of the bluff – 69 dBA.	Residences along Neptune Avenue on the bluffs approximately 60 to 80 feet above the beach.
Cardiff	Ocean wave noise, residential and commercial landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Top of the bluff – 68 dBA. Nearby rest area – 64 dBA.	Residences east of Coast Highway 101 and the railroad at least 900 feet north and south of the sand placement site. Overnight campers at San Elijo State Beach, approximately 1,500 feet from the placement site.
Solana Beach	Ocean wave noise, residential landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Residences on the bluffs above the beach – 63 to 66 dBA. Materials placement site 35 feet west of the bluff on the beach – 69 dBA.	Residences along Helix Avenue and South Sierra Avenue, on the bluffs – approximately 65 feet above the beach.
Torrey Pines	Ocean wave noise, residential landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	At 20 feet west of a rock berm at beach level – 69 dBA.	Residences and businesses approximately 2,000 feet from the sand receptor site (near Carmel Valley Road).

Source: SANDAG 2011

Noise Regulations

Federal and state noise regulations have been established to protect public health and safety and prevent disruption of various human activities. The EPA Office of Noise Abatement and Control was established to coordinate federal noise control activities after its inception, issued the federal Noise Control Act of 1972, which established programs and guidelines to identify and address the effects of noise on public health and welfare and the environment. However, EPA transferred

responsibilities for regulating noise control policies from the federal government to state and local governments.

Local jurisdictions have established criteria to regulate noise through the development of general plan noise elements and noise ordinances, which are generally intended to promote and/or protect the public health and comfort of residents. Therefore, activities conducted in compliance with local noise ordinances would not result in significant impacts. Noise ordinances can restrict both overall noise levels generated, as well as hours of specific activities, regardless of noise generated. If an activity operates outside of the limits set by ordinances, a noise variance can be granted by the jurisdiction, particularly if the project is in the interest of the public and provides a public benefit. If a variance is not granted, activities can only proceed in compliance with the ordinance. Applicable regulations are detailed in Appendix C of this EIR/EIS, but within the cities of Solana Beach and Encinitas and San Diego County, construction work is prohibited between the hours of 7:00 p.m. and 7:00 a.m. on weekdays and Saturdays, and on Sundays and holidays, unless a variance is granted. In addition, there is an 8-hour average construction noise level limit for San Diego County and the City of Solana Beach of 75 dBA $L_{eq(8)}$ between 7:00 a.m. and 7:00 p.m. measured at the property line, and a construction noise level limit for Encinitas of 75 dB not to be exceeded for more than 8 hours between 7:00 a.m. and 7:00 p.m. per 24-hour period measured at the property line. Many of the materials placement sites are located within California State Parks (Leucadia, Moonlight, Cardiff, and Torrey Pines), which do not regulate construction noise hours or levels. While regulations within some of the sites would not affect placement, noise levels at nearby sensitive receptors within adjacent jurisdictions are also identified as part of the analysis below.

Vibration Regulations

There are no specific regulations for vibration from the County of San Diego or cities of Solana Beach or Encinitas. The Federal Transit Administration (FTA) provides guidance for analysis of groundborne noise and vibration related to transportation and construction-induced vibration. The proposed project is not subject to FTA; however, these FTA guidelines serve as a useful tool to evaluate vibration impacts. With respect to human response within residential uses (e.g., annoyance, sleep disruption), FTA recommends a maximum acceptable vibration standard of 80 VdB (FTA 2006).

Caltrans also provides guidance for analysis of groundborne noise and vibration. The proposed project is not subject to Caltrans regulations; however, these guidelines serve as another useful tool to evaluate vibration impacts. Caltrans guidelines recommend that a standard of 0.2 in/sec PPV not be exceeded for the protection of normal residential buildings, and that 0.08 in/sec PPV not be exceeded for the protection of old or historically significant structures (Caltrans 2004).

3.12.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to noise would occur if implementation of the proposed project would:

- A. Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies,
- B. Expose persons to or generate excessive groundborne vibration or groundborne noise levels,
- C. Result in a substantial permanent increase in ambient noise levels in the SELRP vicinity above levels existing without the SELRP, and
- D. Result in a substantial temporary or periodic increase in ambient noise levels in the SELRP vicinity above levels existing without the SELRP.

The thresholds above are from CEQA Appendix G and mirror the thresholds suggested by the County.

3.12.3 ENVIRONMENTAL CONSEQUENCES

The project is habitat restoration, so there are no permanent structures being built that would generate noise. Noise generation would be from the multi-year construction period. Periodic maintenance would be the only “permanent” potential for noise increase, and that would vary by alternative. The lagoon noise analysis is generally structured around the type of noise-generating construction activity, instead of by significance threshold. Thus, the various types of construction activities (on-road noise, off-road noise, and dredging) are considered relative to the standards of the three local jurisdictions for daytime and nighttime operations (Criterion A); changes to ambient noise levels with and without the project (Criterion D) are also considered. The issues of vibration and permanent noise are addressed holistically instead of by construction activity type (Criteria B and C). The materials disposal analysis reflects a different type of construction activity; this project element would not be permanent.

Lagoon Restoration

Alternative 2A

On-Road Vehicle Noise during Construction (Daytime Activities)

Local roadways that would handle the bulk of project construction traffic include I-5, Coast Highway 101, Manchester Avenue, and Lomas Santa Fe. Project trip distribution is provided in the traffic study prepared for the project (Appendix J) and discussed in Section 3.10 Traffic, Access, and Circulation. Existing and existing plus project traffic noise levels were modeled using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (RD-77-108). Output data sheets are provided in Appendix L. As shown in Table 3.12-5, project construction traffic would not result in detectable increases in ambient noise levels at nearby sensitive receptors along affected roadways.

**Table 3.12-5
On-Road Construction Traffic and Affected Noise-Sensitive Receptors**

Affected Road Segment	Affected Sensitive Receptors	Noise Levels with and without Project Traffic CNEL/CNEL ¹	Noise Levels with and without Project Traffic L _{eq} /L _{eq} ¹
Coast Highway 101	<u>Coastal</u> . Homes on West Circle Drive, Overnight campers at San Elijo State Beach <u>West Basin</u> . Single-family residences along San Elijo Avenue, West Circle Drive, Acadia Avenue, Solana Point Circle and Seabright Lane	70/70	60/60
Manchester Avenue	<u>Central Basin</u> . Homes along Manchester Avenue, west of I-5 <u>East Basin</u> . NA	63/63	52/52
Lomas Santa Fe	Homes along Lomas Santa Fe	68/68	57/57
Chesterfield Drive	Homes along Chesterfield Drive	63/63	52/52

¹ Noise levels are modeled at 50 feet from centerline of respective roadways. Project traffic study is included as Appendix J. FHWA Output Data is included in Appendix L.

Another analysis was conducted utilizing the FHWA Highway Traffic Noise Prediction Model to evaluate the noisiest traffic hour that is expected to occur during project construction. This hour is expected to occur during the demolition of existing Coast Highway 101 and construction of a bridge to span the new lagoon inlet. Construction of the bridge would involve both demolition and construction, both of which would be variable in terms of worker and truck traffic generation. Worst-case construction traffic volumes associated with these activities would include 20 employee vehicles and 15 trucks arriving to the site. Traffic noise levels are expected to reach 47 dBA L_{eq} and 48 dBA CNEL. The model output sheets for this analysis are provided

in Appendix L. Even if applied to the quietest measured location in the lagoon area (47 L_{eq} at ST-6 east of I-5), worst-case project construction traffic noise would not result in substantial temporary increase in ambient noise levels. Traffic noise needs to double to achieve a 3 dBA increase, an increase that is barely audible to a trained ear (Caltrans 2009). **Impacts would not be substantially adverse and would be less than significant (Criterion D).**

The subject traffic on nearby roads would occur during the routine construction time period of 7 a.m. to 7 p.m. (or daylight hours). Nighttime work would be associated with dredging inside the lagoon; this is addressed separately below. Thus, the on-road element of construction would be consistent with applicable standards. **Impacts would not be substantially adverse and would be less than significant (Criterion A).**

Off-Road Vehicles and Construction Equipment (Daytime Activities, Excluded Dredging)

Noise levels associated with typical off-road vehicles and construction equipment that may be used on the project site are presented in Table 3.12-6 (dredging equipment is discussed separately below). Also, construction equipment has mandatory backup alarms. Therefore, the equipment noise presented in Table 3.12-6 would be accompanied at times by backup alarm noise. Dredges are not typical construction equipment and have not been included in FTA noise level research. Potential dredge noise has been addressed separately below to allow for its incorporation into the noise analysis for the SELRP.

**Table 3.12-6
Noise Levels of Typical Construction Equipment**

Equipment	Maximum Noise Level (dBA) 50 Feet from Source
All other equipment (5 HP or less)	85
Backhoe	80
Compactor (ground)	80
Compressor (air)	80
Dozer	85
Dump Truck	84
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator (25 KVA or less)	70
Generator (more than 25 KVA)	82
Grader	85
Drill Rig Truck	84
Pumps	77
Soil Mix Drill Rig	80
Tractor	84

HP = horsepower; KVA = kilovolt ampere
Source: FTA 2006

A worst-case equipment usage scenario was developed to assess potential noise impacts associated with off-road equipment. The equipment scenario includes two dump trucks, a bulldozer, and a large backhoe operating concurrently and in proximity to each other. Over a period of 1 hour, the equipment would operate at an assumed load factor of 40 percent (to account for worker breaks, change in construction activities, and maintenance), resulting in an average noise level of approximately 81 dBA L_{eq} at 50 feet, which would decrease conservatively (for a hard acoustic surface) by approximately 6 dBA with each doubling of distance. For example, the above worst-case scenario of approximately 81 dBA L_{eq} at 50 feet would attenuate to 75 dBA L_{eq} at 100 feet, and 69 dBA L_{eq} at 200 feet. Therefore, construction noise is of greatest concern when construction activity is closest to adjacent residential property lines.

The allowable construction noise level limit at residential property lines for the cities of Solana Beach and Encinitas and the County of San Diego is not to exceed an 8-hour average noise level of 75 dBA $L_{eq(8)}$ at a residential property line during the allowable construction hours of 7 a.m. to 7 p.m. The proposed project's worst-case 1-hour average construction noise level of 81 dBA $L_{eq(1)}$ at 50 feet from a residential property line must be evaluated when averaged over an 8-hour period.

Figure 3.12-1 identifies areas of sensitive receptors within 1,000 feet of construction activity (including dredging) associated with lagoon restoration (see pink shading). As shown, sensitive receptors 1,000 feet or less from the activity are primarily west of I-5, with a single row of homes in that radius east of I-5 in Solana Beach.

Figure 3.12-1 also illustrates the location of the 81 dBA L_{eq} noise contour (1-hour average) in relation to sensitive receptors located adjacent to, or within, that key contour. The two inserts in the figure reflect varying conditions. Insert A reflects the only place where nighttime dredging would be within 1,000 feet of residences (dredging impact evaluation is below). Insert B illustrates the residences that are closest to non-dredging construction activities (daytime only) and denotes the 81 dBA L_{eq} relative to the units.

Sensitive receptors in Insert B are primarily on the small hill overlooking the lagoon. Construction activity at the dirt road highlighted in Insert B (off North Rios Avenue) would be periodic (deliveries, crew changes, etc.) and limited to daytime hours in compliance with local noise ordinances. Peak noise levels would exceed 75 dBA at some times, depending on equipment use. Given periodic use, standard construction worker breaks, and on-site construction equipment/vehicle repositioning and maintenance, however, the transitory vehicular construction sound level limit averaged over an 8-hour period would be less than 75 dBA $L_{eq(8)}$ at any

particular property line. Therefore, noise levels would not exceed the 75 dBA $L_{eq(8)}$ construction noise level limit established by the cities or County. To further minimize noise levels at adjacent residences, construction equipment, fixed or mobile, would be equipped with properly operating and maintained mufflers (PDF-8).

Removal of vegetation materials cleared from the lagoon would primarily occur through Site 7 (Figure 2-15), which would be sited adjacent to the I-5 on-/off-ramps to limit encroachment into adjacent neighborhoods. The site is located within the existing 75 dBA CNEL contour as identified by Encinitas, and is affected by traffic along the key regional highway I-5. Equipment at this site would be at least 300 feet from the nearest residential property line. Truck trips in and out could start early and end late to maximize operational hours of the landfill, but would remain within the 7 a.m. to 7 p.m. window. Vegetation removal is anticipated to occur over a 6-month period. In an 8-hour average, noise levels would not exceed the 75 dBA $L_{eq(8)}$. **Impacts at the worst-case residential location (Insert B) or vegetation removal staging area (Site 7) would not be substantially adverse and would be less than significant (Criterion A).**

Dredging within San Elijo Lagoon (Daytime and Nighttime Activities)

Areas proposed for dredging are shown in Figure 3.12-1. Dredging may be achieved with diesel and/or electric hydraulic dredges. Dredges can be very different from each other, with some engines totally enclosed, and others exposed on the deck, which are louder. Exposed engines can be housed to reduce noise. For the purposes of this analysis, both electric and diesel dredges are evaluated.

The exact horsepower, location, and configuration of the diesel engines and electric motors that would be part of the dredging system have not yet been determined. Noise produced from a hydraulic dredging operation within the Newport Bay area was measured to provide a reasonable noise estimate; specifically, an average noise level of 73 dBA L_{eq} at 50 feet (USFWS and SDRPJA 2000). This noise level is consistent with a diesel dredge measured near Ross Island with the engine room door open (Ross Island 1999). The precise electric dredge that could be used for the SELRP would be dependent on the contractor selected for the project and availability of equipment and is also not known at this time. It is likely that noise levels would be comparable to or less than the electric dredge that is used to dredge the navigation channels in the Port of Los Angeles, which generates 71.5 dBA L_{eq} at 50 feet (USFWS and SDRPJA 2000). Use of a diesel dredge represents the worst-case scenario. For purposes of this analysis, a noise reference level of 73 dBA L_{eq} at 50 feet for a diesel dredge is reasonable, and dredge noise levels would increase to 75 dBA L_{eq} at a closer distance of 40 feet from the dredge. Exposed engines on dredging equipment would be housed when possible to further reduce noise levels at residences

adjacent to active dredging (PDF-9), but that reduction is not factored into this analysis in order to provide a conservative noise condition.

Because the dredge equipment would be much farther than 40 feet from sensitive receptors for the vast majority of construction, the 8-hour average construction noise level limit of 75 dBA $L_{eq(8)}$ for the City of Encinitas, City of Solana Beach, and County of San Diego would not be violated during daytime dredging activities. The one area where the dredge would be within 40 feet of residential property lines is illustrated in Insert A. Here, during the day, the dredge would be mobile over an estimated 6 months, generally near Coast Highway 101 and the along the channel along both sides of the NCTD railroad. Because of its mobile nature and the distance between the dredge and property lines, noise levels would not exceed the 75 dBA $L_{eq(8)}$ during the permitted daytime operating hours at any one property line. **Impacts would not be substantially adverse and would be less than significant (Criterion A).**

Dredging activities are possible within the lagoon 7 days a week, 24 hours a day. As noted above, noise thresholds limiting sound levels to 75 dBA $L_{eq(8)}$ during a 24-hour period would not be exceeded. However, due to proposed dredging outside of permitted daytime hours, variances would be required from the cities of Encinitas and Solana Beach and the County in order to operate dredging equipment on Sundays, holidays, and Mondays through Saturdays between 7 p.m. and 7 a.m. With issuance of a variance, 24-hour operations could occur, and **impacts would not be substantially adverse under NEPA. Even with an approved variance, impacts would be considered significant under CEQA (Criterion A).** If no variance is issued to allow nighttime work, dredging would be restricted to daytime hours in compliance with local noise regulations. This restriction would limit the feasibility of the current project construction approach, and additional CEQA analysis would be required.

Vibration and Long-Term Maintenance (Daytime Activities)

Vibration-inducing construction equipment could include vibratory rollers, hoe rams, dozers, jackhammers, and haul trucks. With the exception of the dozers/trucks, these are generally not associated with restoration dredging and habitat restoration, but could be used as part of Coast Highway 101 modifications and CBF installation at the new inlet. Although construction activities could generate perceptible vibrations to people in the immediate vicinity of the inlet/bridge construction sites, vibration levels dissipate rapidly over short distances (i.e., 50 feet). Ground-borne noise and ground-borne vibration levels associated with typical construction equipment are presented in Table 3.12-7. Actual vibration levels are dependent on construction procedures, soil and geologic conditions, and the structural characteristics of the buildings.

Table 3.12-7
Groundborne Vibration and Noise Levels for Typical Construction Equipment

Equipment	Peak Particle Velocity in Inches per Second			Approximate Lv in VdB ¹				
	Groundborne Vibration PPV (in/sec) at 25 Feet	At 50 Feet	At 100 Feet	Ground- borne Noise Lv (VdB) (1 micro- inch/second at 25 Feet	At 50 Feet	At 75 Feet	At 100 Feet	At 150 Feet
Clam Shovel Drop (slurry wall)	0.202	0.071	0.025	94	85	80.5	76	71.5
Vibratory Roller	0.210	0.074	0.026	94	85	80.5	76	71.5
Hoe Ram	0.089	0.031	0.011	87	78	73.5	69	64.5
Large Bulldozer	0.089	0.031	0.011	87	78	73.5	69	64.5
Caisson Drilling	0.089	0.031	0.011	87	78	73.5	69	64.5
Loaded Trucks	0.076	0.027	0.010	86	77	72.5	68	63.5
Jackhammer	0.035	0.012	0.004	79	70	65.5	61	56.5
Small Bulldozer	0.003	0.001	0.0004	58	49	44.5	40	35.5

Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment, 2006

Note: These values are based on the field studies conducted by the FTA (2006). Actual vibration levels are dependent on construction procedures, soil and geologic conditions, and the structural characteristics of the receptors.

¹ LV = velocity level in decibels (VdB) referenced to 1 microinch per second and based on the root mean square velocity amplitude

As shown in Table 3.12-7, a vibratory roller has the highest groundborne vibration level of 0.21 in/sec PPV at 25 feet and 0.074 in/sec PPV at 50 feet. The vibratory roller generates a groundborne noise level of 94 VdB at 25 feet and 85 VdB at 50 feet. Vibration may be perceptible to a small number of people closest to the proposed inlet and bridge construction activities (within 50 feet). These closest receptors would be mobile beach users who would experience the vibration intermittently, not stationary residents inside buildings. The nearest residents would be approximately 1,000 to 1,500 feet to the north. At these more distant locations, vibration would be well below the Caltrans guidelines recommended standard of 0.2 in/sec PPV for the protection of normal residential buildings (Caltrans 2004), and less than the FTA guidelines recommended standard of 80 VdB maximum for human annoyance within residential buildings (FTA 2006). **Impacts would not be substantially adverse and would be less than significant (Criterion B).**

There would be no permanent noise-generating uses associated with the project. Long-term maintenance activities would be required every 3 to 4 years under this alternative to remove approximately 300,000 cy of material for placement on the adjacent Cardiff beach. Other maintenance requirements would be determined during the long-term monitoring program, and may include plant replacement, weed abatement, trash removal, and bank protection repair. Impacts associated with maintenance dredging and bank repair would be less than those described above under temporary impacts, and would generate temporary and negligible amounts of noise.

No substantial adverse impacts would occur. Impacts would be less than significant (Criterion C).

Alternative 1B

Because no new inlet would be constructed and Coast Highway 101 bridge work would be limited to retrofitting the existing structure, construction traffic operations and equipment noise associated with Alternative 1B would be less than those described under Alternative 2A. Specific trip generation numbers may vary by basin, but would not be in excess of numbers analyzed for Alternative 2A. Therefore, the noise traffic analysis discussed above for Alternative 2A is also applicable to this alternative. **Impacts would not be substantially adverse and would remain less than significant (Criteria A and D).**

Dredging and other construction noise and vibration associated with this alternative would be less than noise and vibration generated by Alternative 2A due to the smaller footprint and no construction of a bridge/inlet, resulting in a shorter period of project noise levels at sensitive receptors. While the noise standard of 75 dBA $L_{eq(8)}$ shared by the City of Encinitas, City of Solana Beach, and County of San Diego would not be violated during daytime hours, nighttime and weekend dredging activities are proposed within the lagoon. Variances would be required from the cities of Encinitas and Solana Beach to operate dredging equipment on Sundays, holidays, and Mondays through Saturdays between 7 p.m. and 7 a.m. With issuance of a variance, 24-hour operations could occur, and **impacts would not be substantially adverse under NEPA. Impacts would be considered significant under CEQA (Criterion A).**

Permanent noise from maintenance and vibration associated with Alternative 1B would be less than that described under Alternative 2A. The primary possible vibration source (new inlet and CBF) would not be constructed under this alternative. Maintenance of the channel would involve approximately 40,000 cy annually, would occur over 4 weeks during daytime hours, and would be focused under Coast Highway 101 and in the channel between Coast Highway 101 and the railroad. This would be similar to the existing inlet maintenance location, and would not exceed the City of Encinitas 75 dBA $L_{eq(8)}$. Short-term noise levels at sensitive receptors **would not be substantially adverse and would be less than significant (Criteria B and C).**

Alternative 1A

Construction traffic operations and equipment noise associated with Alternative 1A would be less than that for Alternative 1B because there would be less grading and material redistribution. The noise analysis related to traffic noise discussed above for Alternative 2A would be worst-case because it involves maximum grading and construction of a new bridge/inlet, and

Alternative 1A would have no substantial adverse or significant impacts. Dredging and other construction noise and vibration associated with Alternative 1A would be less than noise and vibration generated by Alternative 2A or Alternative 1B, due to the smaller footprint. Noise standards for the cities of Encinitas and Solana Beach and the County would not be violated during daytime hours. Nighttime and weekend dredging activities are proposed within the lagoon, outside of permitted hours. Variances would be required from the cities of Encinitas and Solana Beach in order to operate dredging equipment on Sundays, holidays, and Mondays through Saturdays between 7 p.m. and 7 a.m. With issuance of a variance, 24-hour operations could occur. **Impacts would be considered significant under CEQA (Criterion A only), even if a variance were issued. Temporary impacts would not be substantially adverse and would remain less than significant (Criterion D), as would vibration impacts (Criterion B). No substantial adverse impacts would occur under NEPA (all criteria).**

Permanent noise associated with routine inlet maintenance of Alternative 1A is expected to be similar to Alternative 1B and existing activities. **Impacts would not be substantially adverse and would remain less than significant (Criterion C).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in construction-related vehicle trips, modification of Coast Highway 101, or dredging activities, beyond existing periodic inlet opening. **The No Project/No Federal Action Alternative would not impact the noise environment and, therefore, would not be substantially adverse. Impacts would be less than significant (Criteria A, B, C, and D).**

Materials Disposal

The SELRP is proposing to utilize many of the same sites for material placement that were analyzed as sites for the 2012 RBSP. The following discussion is largely based on the 2012 RBSP EA/EIR (SANDAG 2011). Figures 2-11A through 2-11F are useful for reference in this discussion, as well as Table 3.12-4.

The principal project noise at sensitive receptors during sand placement would be from construction equipment as the sandy material is moved around the beach and delivery pipelines are assembled and disassembled. Materials placement would possibly occur 24 hours per day, 7 days per week (similar to dredging). Both of the prior similar regionwide beach nourishment projects were constructed via the 24/7 approach.

At the materials placement sites, diesel engines would be used in bulldozers, loaders, forklifts, and cranes, as required. Noise levels vary, as equipment may come in different sizes and with engines of varying horsepower. Construction equipment noise levels also vary as a function of activity level or duty cycle. In a typical construction project (without pavement cutting or breaking), the loudest short-term noise levels are those of earthmoving equipment under full load, which would be approximately 85 dBA L_{max} at a distance of 50 feet from the source. However, with equipment moving from one point to another, work breaks, and idle time, the long-term noise level averages are lower than louder short-term noise events. For purposes of analysis of the proposed project, a maximum 1-hour average noise level of 80 dBA L_{eq} at 50 feet from the center of construction activities is assumed to occur (SANDAG 2011). Noise levels averaged over longer period such as 8 hours would be further reduced to below a 75 dBA $L_{eq(8)}$ for the same reasons; i.e., daily mobilization, moving from one point to another, work breaks including lunch, idle time, and daily demobilization over an 8-hour period. Materials placement is completed from one end of the site to the other, and work along approximately 100–200 feet of beach can typically be completed per day.

Representative noise levels were taken for the 2012 RBSP EA/EIR at Imperial Beach and Mission Beach during sand deposition/maintenance activities similar to those expected to occur with implementation of the proposed project (SANDAG 2011). Working noise levels were measured, and then ambient background noise was mathematically removed, to generate an estimated noise level of 74 to 77 dBA at a distance of 50 feet. Idling noise levels were estimated at 65 to 68 dBA at 50 feet. These are considered typical noise levels for beach equipment that may be used for the SELRP, and the referenced 80 dBA L_{eq} at 50 feet used in this analysis for impact determination is conservative. It is also noted that construction equipment is equipped with mandatory backup alarms, and sand distribution requires construction equipment to back up frequently. Therefore, the diesel engine noise would be accompanied at some times by backup alarm noise.

There may be a need to pump the sand/water slurry mixture for distances greater than 10,000 feet (Phases 1 and 3 only). Figure 3.12-1 identifies four possible pump locations: one by I-5, two near bends in the channel at the existing inlet and near the railroad bridge, and one near the possible new channel. Diesel engines for slurry pumps are typically housed in an enclosure that provides noise reduction. A noise level of 77 dBA at 50 feet is assumed (FTA 2006).

After materials placement/disposal is completed, no additional operational noise would occur; therefore, the temporary impact analysis below focuses on construction. **No significant permanent noise impacts would occur under the project alternatives for materials disposal/placement (Criterion C). No substantial adverse impacts would occur (NEPA).**

Alternative 2A

Moonlight Beach and Cardiff Beach – Beach Receptors

Sand placement sites at Moonlight Beach (Figure 2-11B) and Cardiff Beach (Figure 2-11C) have either beachfront residences, restaurants, or public open space at generally the same elevation as the sites. Residences at Moonlight Beach are within 50 feet of the nearest points of planned sand placement only at the northern and southern termini of the site. The vast majority of the site is adjacent to Moonlight Park. Residences in the area of Cardiff Beach are more than 900 feet north and south of the proposed sand placement site, but restaurants are within 50 feet of the sand placement. Dominant existing noise sources at these two locations are surf activity and traffic on nearby local roads. Ambient noise levels at sensitive receptors adjacent to these beaches range from 64 to 70 dBA L_{eq} .

During sand placement, the principal project noise at beachfront residences and restaurants would be from construction equipment. Sand placement activities may reach up to 80 dBA L_{eq} at the homes closest to the sand placement area at Moonlight Beach. When averaged over an 8-hour period, sand placement activities would include some periods with little or no equipment noise (e.g., when equipment repositions to different locations or shifts up or down the beach). Therefore, sand placement activities would have average noise levels of less than the 75 dBA $L_{eq(8)}$ guidance for the cities of Solana Beach and Encinitas and the County of San Diego.

Noise levels associated with sand placement would attenuate to ambient noise levels at distances of 100–175 feet from the spreading equipment. Sand placement activities would not be audible at the homes or the campground sites closest to the Cardiff Beach placement site.

When nighttime sand placement occurs within 100 feet of a residence, the change in noise environment is anticipated to disturb the sleep of some residents. This situation would occur only at the Moonlight Beach site and only at the northern and southern ends of the receiver site. A noise variance would be required to conduct nighttime sand placement. Closing windows would reduce the noise level, but the change in the volume and character of the noise may still disturb sleep. To minimize impacts to individual residents, they would be notified 1 week in advance of nighttime construction work that would occur within 100 feet, and work would last no longer than 3 consecutive nights within 100 feet (PDF-72). **No substantial adverse impacts would occur under NEPA. Impacts would be considered significant under CEQA for nighttime sand placement (Criteria A and D).**

Up to three booster pumps may be located within and near the Cardiff receiver site (Figure 3.12-1). If the pump is located at least 250 feet from a sensitive receptor, then the noise at the

receptor would be 56 dBA L_{eq} . This noise would be at least 5 dBA below ambient noise levels. The pumps would range from approximately 250 to 1,500 feet from the nearest sensitive receptors, with the closest pump south of the existing inlet and south of the campground. **No substantial adverse impacts would occur under NEPA. Impacts would be considered significant under CEQA due to nighttime operations (Criteria A and D).**

Leucadia and Solana Beach – Bluff Receptors

Sensitive noise receptors at these sites are residences located on bluffs above the sand placement sites. Bluffs are on average 40 feet above the beach. Ambient surf noise levels at these residences are estimated at 63 to 66 dBA L_{eq} . Although these homes are also adjacent to the beach, the topography and a slightly greater distance from the residences to the sand replenishment areas result in more noise attenuation. Sand placement activities are expected to generate noise levels of 79 dBA L_{eq} at the edge of the bluff. It should be noted that the equipment noise would drop by 5 dB as soon as the direct line of sight to the receptor is broken. This is expected to occur at a point approximately 10 feet back from the edge of the bluff. Noise levels at the actual residential structures on the bluffs along the Leucadia and Solana Beach placement sites would vary. However, when averaged over an 8-hour period, sand placement activities would include some periods with little or no equipment noise, as described under Alternative 2A. Therefore, daytime sand placement activities would fall within the allowable construction noise level of 75 dBA $L_{eq(8)}$.

There could be materials placement during nighttime hours, and this change in noise environment is anticipated to disturb the sleep of some residents on the bluffs in both sites when within 100 feet of the activity. A noise variance would be required to conduct nighttime sand placement. To minimize impacts to individual residents, they would be notified 1 week in advance of nighttime construction work that would occur within 100 feet, and work would last no longer than 3 consecutive nights within 100 feet (PDF-72). **No substantial adverse impacts would occur under NEPA. Impacts would be considered significant under CEQA for nighttime sand placement (Criteria A and D).**

Torrey Pines Beach

The nearest residential receptors to this sand placement site front Carmel Valley Road and are approximately 2,000 feet to the north and east. Two major roadways and a rail line separate these receptors from the beach area. Even under favorable atmospheric conditions for noise transmission, project-related construction noise may only be faintly heard at these receptors. The placement site is located within a California State Park, which does not limit construction hours or have noise limits. Because there are no restrictions at the site and noise would be heard at the

nearest residences only faintly, if at all, **impacts would not be substantially adverse and would be less than significant under CEQA (Criteria A and D).**

SO-5 and SO-6

The stockpile area at SO-5 is located approximately 2,500 feet from the nearest beachfront residents at the closest point in the City of Del Mar. Beachfront residents located adjacent to sand placement sites associated with SO-6 would be located a minimum of 3,350 feet away in the community of Cardiff. Even with the normal prevailing onshore wind, noise associated with offshore placement activities at these locations would not be readily audible at sensitive receptors. **Impacts would not be substantially adverse and would be less than significant (Criteria A and D).**

Vibration

The primary vibration source for the proposed project would be construction equipment used for sand-spreading activities. Sand alone, without silt or clay, is a poor medium for the transfer of vibrations, and the activity would not involve pile driving, soil compacting, jack-hammering, or demolition-related activities, which more typically generate vibration. Sensitive receptors in the vicinity of the materials placement sites may be aware of groundborne vibrations if they are within 50 feet of sand-spreading activities, but the vibrations would not be disruptive to residences or other sensitive uses. **Impacts would not be substantially adverse and would be less than significant (Criterion B).**

Alternative 1B

Although Alternative 1B proposes to use the same sand placement sites as Alternative 2A, impacts associated with Alternative 1B would be incrementally less, as less material would be deposited (200,000 fewer cy under this alternative). This may result in placement at fewer sites, a shorter duration for sand placement activities at a given site, or fewer trips to a stockpile location. Regardless, materials placement would occur at nighttime, outside of the hours allowed within the cities of Solana Beach and Encinitas. A variance would be required from the cities if sand placement on a city beach would occur at night, and **impacts would be considered significant under CEQA (Criteria A and D). No substantial adverse impacts would occur.**

Alternative 1A

Alternative 1A proposes to dispose of removed materials at LA-5. There are no sensitive receptors along the barge delivery route or at the site itself. **No noise impacts would occur and,**

therefore, would not be substantially adverse and would remain less than significant (Criteria A, B, and D).

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in sand placement activities. **The No Project/No Federal Action Alternative would not impact the noise environment or cause ground vibration and, therefore, noise impacts would not be substantially adverse and would remain less than significant (Criteria A, B, and D).**

3.12.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Due to nighttime dredging and materials placement activities, significant impacts have been identified under CEQA for each of the alternatives due to lagoon restoration activities and materials disposal/reuse activities associated with the SELRP. No substantial adverse impacts per NEPA would occur. Design features have been incorporated into the project to minimize equipment noise during construction at nearby residences, including housing exposed engines and ensuring equipment has effective mufflers. At materials placement sites, construction would be limited to 3 consecutive nights within a distance that could disturb sleep at a given residence (100 feet). Even with implementation of these measures, nighttime construction outside of allowed hours would result in significant impacts. Noise walls and limiting dredging and materials placement activities to daytime hours were considered to reduce this impact, but rejected, as described below. Noise impacts from nighttime dredging and materials placement remain significant and unavoidable with implementation of Alternative 2A, Alternative 1B, and Alternative 1A.

The use of noise walls was considered as an option for noise reduction. However, the expanse of the lagoon and the continual moving dredge make the placement of noise walls less effective, also considering that many noise-sensitive receptors are located on the bluffs and hillsides surrounding the lagoon and would not receive beneficial noise reduction from a noise wall located at lower elevations. At sand placement sites, the active work areas on the beaches would shift approximately 100–200 feet per day. The construction of noise walls is not efficient when left in place for a very short time before needing to be removed and relocated to another location to keep pace with the noise source. For these reasons, the use of noise walls to reduce noise levels at sensitive receptors during nighttime construction activities was found less effective than controlling noise at the mobile noise source, such as with engine enclosures, where possible (e.g., on dredge equipment).

Limiting dredging and materials placement activities to daytime hours was considered to reduce significant impacts associated with nighttime construction to less than significant. If such limits were implemented, however, overall construction time to implement the SELRP would be extended substantially. Dredging equipment operates most efficiently if run continually since dredged material is entrained in a slurry of water and sand and transported through a pipeline and into a barge. Once at a placement site, the material is again transported through a pipeline to the disposal/placement site in a slurry mix of water and sand (e.g., offshore, nearshore, or beach). If dredging is halted once initiated, the pipes must be cleared to avoid having sand settle out and clog pipelines. Therefore, the efficiency of dredging operations is decreased substantially as pipelines are cleared and then primed at the end and start of each dredge period. In addition, for sand placement to occur at sites not directly adjacent to the dredge area, material is placed into a barge and then transported to the placement site. Once at the site, the material is offloaded through a second pipeline. For beach placement, spreading the material and potentially extending the discharge pipeline must occur before another barge load can be placed on the beach. The sequential nature of beach placement means that if activity is limited to daytime hours and a placement cycle can take up to 5–6 hours, then only a single cycle could occur within a typical 8-hour workday as opposed to completing 4–5 placement cycles within a 24-hour period with continuous dredging/placement activities. This substantial reduction in efficiency leads to an even more substantial increase in schedule. The offshore/nearshore disposal and beach disposal require the installation of pipelines in the surf zone. When these pipelines are left in place in high wave environments they can be buried, broken, or plugged; therefore, less exposure time means less chance of those problems. Extending the schedule also exposes the public to a longer period of equipment and pipe on the beach (at least three times longer). Extending the schedule would also require longer periods of inundation within the lagoon, resulting in potentially higher impacts to vegetation, noise-sensitive species, and trails and recreational amenities. Extending the schedule would also lead to substantially higher construction cost.

3.12.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA conclusions: Noise impacts associated with nighttime implementation of the SELRP would be significant and cannot be mitigated to less than significant.

NEPA conclusions: No substantial adverse noise impacts would occur with implementation of the SELRP.

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3.13 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

Under NEPA, “economic” and “social” effects are environmental consequences to be examined (40 CFR Section 1502.16 and 40 CFR Section 1508.8). Under CEQA, the focus of an EIR is primarily on potential changes to the “physical conditions,” which include land, air, water, flora, fauna, population, housing, noise, and objects of historic or aesthetic significance (PRC Section 21060.5; CCR Title 14 Section 15358(b) and Section 15382). The proposed project is to enhance and restore the physical and biological functions and services of San Elijo Lagoon by increasing the tidal prism to support a diverse range of native intertidal and transitional habitats, and there would be no physical changes to population or housing.

In addition to examining potential social and economic impacts to local and regional populations as a whole, any NEPA document must consider the potential for disproportionate environmental impacts to minority or low-income populations, as well as potential disproportionate environmental health and safety risks to children, in order to comply with relevant federal executive orders. Those analyses are contained in Section 3.13.6 of this EIR/EIS, but the supporting demographic information on population, ethnicity, and income is provided in this section.

The primary social and economic-related focus of the proposed project, as stated in the Purpose and Need of this EIR/EIS (Section 1.2), is intended to enhance a valuable public resource that serves local residents in a number of ways. These include maintaining more than 7 miles of public hiking trails for recreational activities within habitation areas for sensitive species, including endangered plants and animals, and resident and migratory wildlife, thereby providing benefits to the entire regional economy.

This section also presents information on commercial fisheries, the local social and economic sector most likely to be adversely impacted by the materials disposal/reuse component of the proposed project. During the 2012 RBSP impact analysis, stakeholder concerns regarding sand movement and potential impacts to commercial fishing resources were addressed. Since this project includes sand placement at a number of the same sites in the region, fisheries information from the 2012 RBSP is referenced and certain data are updated.

This section contains census data regarding population and income. Commercial fisheries and the relative economic value of various species are discussed in Section 3.13.3. Kelp harvesting value is addressed in Section 3.13.3, followed by recreational fishing and diving value in Section 3.13.4.

3.13.1 AFFECTED ENVIRONMENT

In terms of its broad economic contribution, San Elijo Lagoon provides habitat for sensitive species, including endangered plants and animals, and resident and migratory wildlife. San Elijo Lagoon also offers 7 miles of public hiking trails for recreational activities to local community members and visitors, providing benefits to the entire regional economy.

To provide a localized socioeconomic context for the proposed project, this section presents information on population and income in the project area for two distinct geographies: (1) the area immediately surrounding the lagoon that may be affected by lagoon restoration activities, and (2) the area immediately surrounding materials disposal/reuse sites along the San Diego County coast.

To meet the specific intent of Executive Order 12898 on Environmental Justice (59 *Federal Register* 7629 (1994)), it is necessary to consider the minority and economic status of the population surrounding the San Elijo Lagoon restoration area and materials placement sites. To allow for a subsequent assessment of potential disproportionate impacts to minority populations and low-income populations, it is necessary to compare the same type of demographic and income information for the local jurisdiction and larger region. Therefore, these data provide information on population, ethnicity, median income, and poverty for the area around San Elijo Lagoon and each of the placement sites compared to the local jurisdiction and the San Diego County region. Housing and employment data, often presented in socioeconomic sections of NEPA documents, are not provided in this section as the proposed project is not considered likely to have any direct impact on either housing or employment in the immediate area. Potential positive benefits to employment as a result of construction (temporary) and enhanced recreational and tourism opportunities (long-term) would likely be felt at a regional level.

Census tracts are the standard localized units of land-based analysis for these types of data. The San Elijo Lagoon restoration area is contained within five census tracts, while the materials disposal/reuse study area spans eight census tracts. These census tracts are listed in Table 3.13-1. Some tracts contain all or portions of more than one placement site and some placement sites straddle two census tracts. Some of the census tracts located within the San Elijo Lagoon study area overlap with some census tracts containing disposal/placement sites.

The data presented in this section for census tracts, local jurisdictions, and the region as a whole are from the U.S. Census 2010 100 percent survey or the U.S. Census American Community Survey 2006-2010 5-Year Estimates, depending on data availability.

Table 3.13-1
Census Tract Numbers and Jurisdictional City Boundaries
for San Elijo Lagoon and Proposed Materials Placement Sites

City	Census Tract	Study Area
Encinitas; Solana Beach	173.03	San Elijo Lagoon Study Area
Encinitas; Solana Beach	173.05	San Elijo Lagoon Study Area
Encinitas	174.01	San Elijo Lagoon Study Area
Encinitas	174.04	San Elijo Lagoon Study Area
Encinitas; Rancho Santa Fe; Unincorporated San Diego County	171.06	San Elijo Lagoon Study Area
Encinitas; Solana Beach	173.03	Proposed Materials Placement Site: Cardiff Beach
Encinitas	177.02	Proposed Materials Placement Site: Moonlight
Encinitas	175.01	Proposed Materials Placement Site: Moonlight
Solana Beach	173.04	Proposed Materials Placement Site: Solana Beach
Del Mar	172	Proposed Materials Placement Site: Solana Beach
Encinitas; Solana Beach	173.03	Proposed Materials Placement Site: Solana Beach
Encinitas; Carlsbad	177.01	Proposed Materials Placement Site: Leucadia
San Diego	83.12	Proposed Materials Placement Site: Torrey Pines

Source: U.S. Census Bureau 2010

San Elijo Lagoon Study Area

Population/Ethnicity

Table 3.13-2 shows population characteristics, including total population and race/ethnic distribution, for the census tracts contiguous with the San Elijo Lagoon study area. The table also provides the same ethnic and racial information for adjacent jurisdictions as well as at the county level to facilitate comparison between the affected area and a broader context.

As shown, the total population within the census tracts of the San Elijo Lagoon study area ranges from 2,969 in tract 173.05 to 6,338 in tract 174.04. The minority population includes those who self-identify as Black, Hispanic, Native American, Asian, Native Hawaiian, “some other race,” and “two or more races.” Minority populations within the San Elijo Lagoon study area range from 12.1 percent within tract 171.06 to 23.2 percent within tract 174.04. Those who self-identify as Hispanic make up the majority of the minority population within the San Elijo Lagoon study area, ranging from 40.3 percent of the minority population within tract 173.05, to 71.1 percent within tract 174.04. The minority populations of Encinitas, Rancho Santa Fe, and Solana Beach are 21.2 percent, 10.6 percent, and 22.7 percent, respectively. In San Diego County, 1,595,266 or 51.5 percent of the population is minority, with 62.1 percent of minorities self-identifying as Hispanic. When compared to the population of greater San Diego County, only census tract 174.04 has a proportion higher than its adjacent jurisdiction (Encinitas). However, the percentage of minority residents is substantially lower than the proportion seen at the county level; those census tracts composing the San Elijo Lagoon study area cannot be considered a high minority population area.

**Table 3.13-2
Population and Ethnicity for San Elijo Lagoon Study Area**

Study Area	City	White	Black	Hispanic	Other	Total	Total Minority	Percent Minority
Tract	171.06	4,372	17	321	263	4,973	601	12.1%
	173.03	2,557	10	283	168	3,018	461	15.3%
	173.05	2,542	13	172	242	2,969	427	14.4%
	174.01	4,600	21	375	359	5,355	755	14.1%
	174.04	4,868	29	1,045	396	6,338	1,470	23.2%
	Encinitas	46,881	316	8,138	4,183	59,518	12,637	21.2%
City	Rancho Santa Fe	2,788	10	176	143	3,117	329	10.6%
	Solana Beach	9,944	56	2,048	819	12,867	2,923	22.7%
	San Diego County	1,500,047	146,600	991,348	457,318	3,095,313	1,595,266	51.5%

Source: U.S. Census Bureau 2010

Income

Information on median household income, total in poverty, and percentage in poverty in the census tracts, jurisdictional cities contiguous with the San Elijo Lagoon study area, and the whole of San Diego County, is presented in Table 3.13-3.

Table 3.13-3
Median Household Income and Poverty Rates for San Elijo Lagoon Study Area

Study Area		City	Median Household Income	Total in Poverty	Percentage in Poverty
Tract	171.06	Encinitas; Rancho Santa Fe; Unincorporated San Diego County	\$139,444	268	6.5%
	173.03	Encinitas; Solana Beach	\$121,676	427	12.4%
	173.05	Encinitas; Solana Beach	\$90,430	77	2.7%
	174.01	Encinitas	\$88,342	688	12.2%
	174.04	Encinitas	\$84,744	314	5.0%
City	Encinitas		\$86,845	4,654	8.0%
	Rancho Santa Fe		\$188,859	92	3.2%
	Solana Beach		\$86,845	966	7.6%
County	San Diego County		\$63,069	361,248	12.3%

Source: U.S. Census Bureau 2010

The median household income of the San Elijo Lagoon study area by tract ranges from \$84,744 in tract 174.04 to \$139,444 in tract 171.06. The median household income is \$86,845 in Encinitas, \$86,845 in Solana Beach, and \$188,859 in Rancho Santa Fe. The San Diego County median household income is \$63,069. The total households in poverty by tract range from 77 or 2.7 percent of tract 173.05, to 688 or 12.2 percent of tract 174.01. The highest percentage of households in poverty is within tract 173.03 at 12.4 percent or 427 households. Rancho Santa Fe has 92 households or 3.2 percent of its population in poverty, Solana Beach has 966 households or 7.6 percent of its population in poverty, and Encinitas has 4,654 households or 8.0 percent of its population in poverty. Within the whole of San Diego County, 361,248 households are living in poverty, representing 12.3 percent of the total population. As these data illustrate, the number of households in poverty within the tracts and jurisdictional cities contiguous with the San Elijo Lagoon study area is less than overall San Diego County, with the exception of tract 173.03 with a 0.1 percent higher poverty rate. When compared to the median household income and poverty rates of greater San Diego County, the census tracts and jurisdictions contiguous with the San Elijo Lagoon study area cannot be considered a high poverty area.

Materials Disposal/Reuse Study Area

Population/Ethnicity

Table 3.13-4 shows population characteristics, including total population and race/ethnic distribution, for the census tracts contiguous to the possible materials placement sites. The table also provides the same ethnic and racial information for adjacent jurisdictions as well as at the county level to facilitate comparison between the affected area and a broader context.

As shown in Table 3.13-4, the total population within the census tracts of the materials placement study area ranges from 2,777 in tract 177.02 to 5,275 in tract 177.01. The minority population, which includes those who self-identify as Black, Hispanic, Native American, Asian, Native Hawaiian, “some other race,” and “two or more races,” percentage within the materials placement study area ranges from 10.3 percent within track 172 to 49.6 percent within tract 173.04. Those who self-identify as Hispanic make up the majority of the minority population within the materials placement study area, ranging from 39.9 percent of the minority population within tract 83.12 to 82.2 percent within tract 173.04. The minority populations of Del Mar, Encinitas, Solana Beach, Carlsbad, and San Diego are 9.3 percent, 21.2 percent, 22.7 percent, 25.1 percent, and 54.9 percent, respectively. In San Diego County, 1,595,266 or 51.5 percent of the population is minority, with 62.1 percent of minorities self-identifying as Hispanic. When compared to their respective containing jurisdictions, census tract 173.04 has a much higher proportion of minority residents than Solana Beach, with a difference of 26.9 percent. This can be likely attributed to Eden Gardens, a historic barrio in Solana Beach with an origin traced to Mexican farmers hired by neighboring ranch owners in the 1920s. Although the percentage is lower than what is present for the region, census tract 173.04 is considered a high minority population area for the purposes of environmental justice analyses.

Income

Information on median household income in the census tracts contiguous with the placement sites, as well as median incomes and poverty rates of the contiguous jurisdictional cities and the county in general, is presented in Table 3.13-5.

**Table 3.13-4
Population and Ethnicity for Materials Placement Study Area**

Study Area	City	White	Black	Hispanic	Other	Total	Total Minority	Percent Minority
Tract	83.12	2,968	21	264	376	3,629	661	18.2%
	172	3,758	9	175	204	4,146	388	10.3%
	173.03	2,557	10	283	168	3,018	461	15.3%
	173.04	3,681	20	1,501	306	5,508	1,827	49.6%
	175.01	2,374	13	226	156	2,769	395	16.6%
	177.01	3,997	30	937	311	5,275	1,278	24.2%
	177.02	2,329	3	310	135	2,777	448	16.1%
	Del Mar	3,772	9	175	205	4,161	389	9.3%
City	Encinitas	46,881	316	8,138	4,183	59,518	12,637	21.2%
	Solana Beach	9,944	56	2,048	819	12,867	2,923	22.7%
	Carlsbad	78,879	1,232	13,988	11,229	105,328	26,449	25.1%
	San Diego	589,702	82,497	376,020	259,183	1,307,402	71,770	54.9%
County	San Diego County	1,500,047	146,600	991,348	457,318	3,095,313	1,595,266	51.5%

Source: U.S. Census Bureau 2010

Table 3.13-5
Median Household Income and Poverty Rates for Materials Placement Study Area

Study Area		City	Median Household Income	Total in Poverty	Percentage in Poverty
Tract	83.12	San Diego	\$138,703	126	4.0%
	172	Del Mar	\$112,566	148	3.7%
	173.03	Encinitas; Solana Beach	\$121,676	427	12.4%
	173.04	Solana Beach	\$68,606	405	8.0%
	175.01	Encinitas	\$69,643	314	12.2%
	177.01	Encinitas; Carlsbad	\$78,279	615	12.4%
	177.02	Encinitas	\$57,602	236	8.6%
City	Del Mar		\$112,566	148	3.7%
	Encinitas		\$86,845	4,654	8.0%
	Solana Beach		\$86,908	966	7.6%
	Carlsbad		\$84,728	7,179	7.2%
	San Diego		\$62,480	174,763	14.1%
County	San Diego County		\$63,069	361,248	12.3%

Source: U.S. Census Bureau 2010

The median household income of the materials placement study area by tract ranges from \$57,602 in tract 177.02 to \$138,703 in tract 83.12. The median household income is \$62,480 in San Diego, \$84,728 in Carlsbad, \$86,845 in Encinitas, \$86,908 in Solana Beach, and \$112,566 in Del Mar. The San Diego County median household income is \$63,069. The total number of households in poverty by tract range from 126 (4.0 percent) of tract 83.12, to 615 (12.4 percent) of tract 177.01. The highest percentage of households in poverty is 12.4 percent in both tracts 173.03 and 177.01. Del Mar has 148 households or 3.7 percent of its population in poverty, Carlsbad has 7,179 or 7.2 percent, Solana Beach has 966 or 7.6 percent, Encinitas has 4,654 or 8.0 percent, and San Diego has 174,763 or 14.1 percent. Within the whole of San Diego County, 361,248 households are living in poverty, representing 12.3 percent of the total population. As these data illustrate, the number of households in poverty within the tracts and jurisdictional cities contiguous with the materials placement study area are analogous to overall San Diego County, with the exception of tracts 173.03, 177.01, and the City of San Diego, which have a 0.1, 0.1, and 1.8 percent higher rate, respectively. When compared to the median household income and poverty rates of their contiguous jurisdictions and greater San Diego County, the census tracts contiguous with the materials placement study area cannot be considered a high poverty area.

Commercial Fisheries

San Diego County supports a substantial commercial fishing industry and is also a center for sport and recreational fishing and diving activities. This section describes the commercial fishing activity in the San Diego region and in offshore areas, specific to the SO-5, SO-6, and LA-5

materials stockpiling and disposal sites. The information presented in this section has been taken largely from the 2012 RBSP, which assessed the impacts to commercial fisheries as a result of the dredging and materials transportation activities associated with that project (SANDAG 2011). As discussed elsewhere in this report, SO-5 and SO-6 were borrow sites assessed during the 2012 RBSP analysis; thus, the commercial fisheries description here is applicable and relevant to the proposed SELRP. The primary information referenced here was gathered from CDFW catch statistics, recent work conducted by CDFW for the Marine Life Protection Act, NMFS, and the San Diego Unified Port District (SDUPD).

Regional Overview

Historically, the commercial fishing industry has played a major, although declining, role in the region. The San Diego County major ports include San Diego, Mission Bay, Oceanside, and Point Loma. Aquaculture takes place in Buena Vista and Agua Hedionda lagoons in Carlsbad. In 2007, there were 153 commercial vessels, 145 commercial fishermen, 53 fish-related businesses, and one aquaculture business that reported landings in these ports (California Marine Life Protection Act Initiative 2009).

Although the commercial fishing industry has seen a steady decline in recent decades, the industry is predicted to undergo a substantial revitalization. The decline of the commercial fishing industry has been attributed to competition from other areas and a variety of regulatory, economic, and environmental factors. In terms of participants, the commercial fishing industry was reduced by more than 70 percent from the late 1970s to 1998 (San Diego Unified Port District 1998). During that period, the number of fishing vessels in the San Diego region declined by about 67 percent. In the recent past, it was anticipated that an opportunity may exist for future growth. Although the number of fishing vessels and fishermen in the San Diego region declined from 1999 to 2006, a slight increase occurred from 2006 to 2007 (California Marine Life Protection Act Initiative 2009). One reason for the potential upswing was that the global appetite for seafood had more than doubled over the past 30 years, and a demand for local, sustainable seafood was growing (Unified Port of San Diego 2012).

Employment for fishers and fishing-related workers in San Diego County was projected to increase from 130 to 170 jobs by 2016, surpassing projected employment in the industry for areas such as Los Angeles County and Monterey County (California Employment Development Department 2010); however, more recent employment projections computed since the economic recession occurred suggest that employment for fishers and fishing-related workers will stay constant in San Diego County into 2018 (and actually decrease in Monterey and Los Angeles counties) (California Employment Development Department 2012). The four San Diego ports earned nearly \$200 million in the period from 1985 to 2008 (in 2009 dollars). In 2011 alone,

commercial fishing brought the region nearly \$8 million in ex-vessel value, the price paid to fishermen (California Department of Fish and Game 2012).

Several species of invertebrates and fish found in the project area are economically valuable marine resources. The composition, volume, and value of the local commercial catch have not been stable over time, however, as measured by a number of indices. The composition and relative economic importance of the local fishery has changed as well, with the largest changes attributable to the local decline of the tuna fishery. In 1950, the San Diego County area produced the second-largest volume and value of commercial fish landings among California's six primary fisheries statistical areas, accounting for 25 percent and 35 percent of the state's total commercial fishing landing volume and value, respectively. By 1996, the San Diego County statistical area had dropped to being the state's lowest producer, and area landings had declined to 3 percent of the state's total value of landings. In 2011, this percentage was similar at 3.8 percent of the state's total commercial fishing landing value (California Department of Fish and Game 2012).

In 1980, various species of tuna composed 96 percent of San Diego's volume and value of landings, which demonstrates the role of tuna in these large-scale changes. By 1990, this figure had dropped to less than 1 percent of volume and value of local landings. This trend has continued into recent years. From 1998 to 2008, species such as the California spiny lobster, red sea urchin, California sheephead, squid, and prawn-shrimp pulled in the highest dollar amount of commercial landings. In 2008, the amount of squid harvested increased tremendously in both volume and value (California Department of Fish and Game n.d.).

In the last three decades, the California fishing industry generally harvested less catch, required fewer fisherman, and utilized a smaller fleet in both boat length and numbers to bring the catch to port. Locally, the number of fisherman and boats has declined significantly, but the value of the landings declined only slightly from the 1980s to 1990s (San Diego Unified Port District 1998). Following this trend, the volume of landings in the region decreased slightly from 2000 to 2008, but the total value of landings increased by 9 percent (CDFG n.d.) and was nearly \$205 million in 2011 (CDFG 2012).

In addition to fishery data provided by SDUPD, more specific and regional fishery data are provided by CDFW. These include annual commercial fishery catch and landings in volume (pounds) and value (dollars) by a number of species. Landings are reported by area and port, and catch data are reported by fish block. Fish blocks are statistical areas normally 10 minutes of longitude by 10 minutes of latitude, with blocks adjacent to shore being somewhat smaller, with the area of specific blocks determined by how the shoreline intersects the block area.

Relevant fish blocks and their corresponding shorelines within the project area include blocks 842 (Torrey Pines to Del Mar), 821 (Encinitas), and 878 (offshore, west of Chula Vista and Imperial Beach). Proposed offshore stockpiling site SO-5 is located in fish block 842, offshore stockpiling site SO-6 is located in fish block 821, and materials disposal site LA-5 is located in fish block 878. All fishing gear types are combined and include hook and line, longline, troll, harpoon, trap, seine, and trawl. Assignment of a species to a specific block is not always completely accurate, and fluctuations in annual catches are substantial. Determining the cause of these fluctuations can be difficult due to the complex set of variables that affect fish movements and abundance.

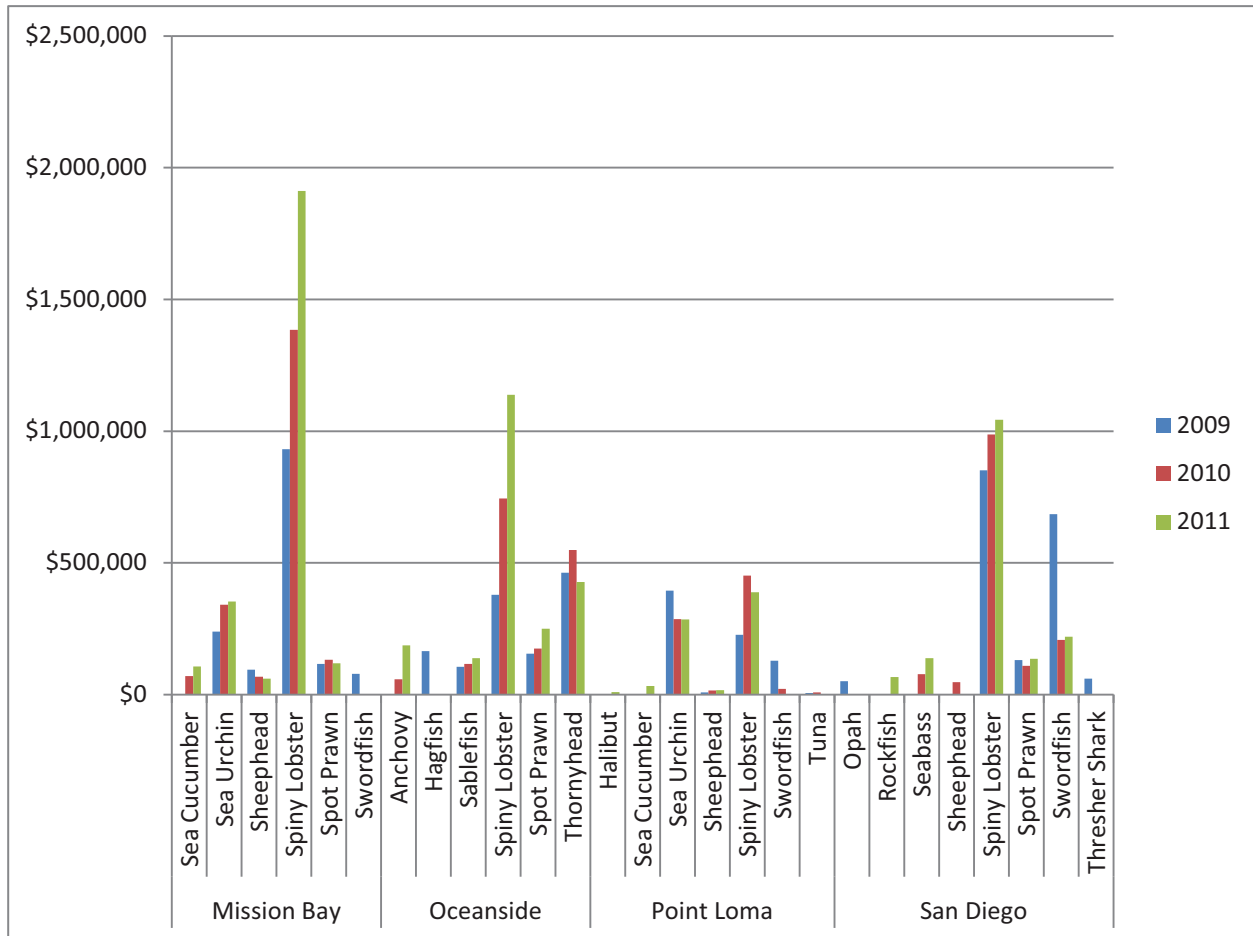
San Diego Commercial Fishing Catch Volume and Value for Nearshore or Potential Nearshore Species by Port

Recently compiled data for the 2012 RBSP showed that the total value of San Diego County commercial landings from 1999 to 2008 for species that occur nearshore or potentially nearshore was \$38 million, or an annual average of \$3.8 million (SANDAG 2011). This dollar amount is ex-vessel value (e.g., whole fish, wholesale price), and the final economic value is about four to five times higher. During this period, commercial landings at Oceanside represented 34.5 percent of the total San Diego County landings. The commercial catch and value changes significantly from year to year. For example, the value of landings for San Diego County in 2008 was \$2.5 million (Port of San Diego plus Oceanside), with Oceanside representing 60 percent of the total. This was in sharp contrast to 1999 when the total landings were \$1.1 million with Oceanside accounting for 22.1 percent of that figure.

Figure 3.13-1 shows recent data for the period 2009 to 2011 for the top five species (by value) for the four major ports in San Diego County: Mission Bay, Oceanside, Point Loma, and San Diego. Even limited to the top five species per year, the annual average value landed for these four ports averaged to just over \$6 million per year. The primary species by value was spiny lobster, which was valued annually at between approximately \$2.4 million (2009) and \$4.5 million (2011), with a 3-year total of over \$10.4 million. Sea urchin was second in value for the years 2009 to 2011, with a total of \$1.9 million over the 3-year span. Thornyhead (\$1.4 million), swordfish (\$1.34 million), and spot prawn (\$1.32 million) rounded out the top five species for total value between 2009 and 2011.

It should be noted that, unlike fish block harvest data, the commercial port landing data of nearshore or potential nearshore species for San Diego County include catch from the Channel Islands as well as from areas along the mainland. The proportion of catch attributable to areas other than the San Diego County coastline cannot be determined from available records.

Figure 3.13-1
Value for the Top Five Species, by San Diego County Port, 2009–2011



Source: CDFG 2012, 2011, 2010

Economic Importance of Nearshore Species by Fish Block

Table 3.13-6 provides information recently published as part of the 2012 RBSP analysis. The table shows a breakout of ex-vessel value of most valuable nearshore species for the relevant fish blocks for the period 1999 to 2008 to facilitate comparisons by block. Clearly, lobster and spot prawn are the most valuable in terms of dollar amount.

Table 3.13-6
San Diego County Average Landings by Fish Block for 1999 to 2008
Most Valuable Nearshore Species Average Values (U.S. Dollars)

Species	Area Name and Fish Block Number		Totals
	Encinitas/Solana Beach Block 821 (SO-6)	Del Mar/Torrey Pines Block 842 (SO-5)	
Lobster	\$226,639	\$125,563	\$352,202
Urchin	\$3,470	\$1,411	\$4,881
Rock Crab	\$3,912	\$9,133	\$13,045
Swordfish	\$0	\$1,583	\$1,583
Spot Prawn	\$1,521	\$48,714	\$50,235
Sheephead	\$6,113	\$14,754	\$20,867
Squid	\$0	\$28,530	\$28,530
Total	\$241,655	\$229,688	\$471,343

Source: SANDAG and U.S. Army Corps of Engineers 2011

In terms of geographic distribution of valuable nearshore species, the value of species caught in blocks 821 and 842 is relatively small compared to other nearby blocks, including Block 860 (La Jolla to Point Loma). As described in the 2012 RBSP, Block 860 accounted for 75.0 percent of the total value for the species listed. Within blocks 821 and 842, spiny lobster is top species in terms of value at \$352,202, which was 65.1 percent of the total value for the species listed over the 10-year span. Spiny lobster value was higher in Block 821 (64.3 percent of the value between the two blocks), while spot prawn value was substantially higher in Block 842 (96.7 percent of the value between the two blocks).

Recent data are unavailable for Block 878, in which LA-5 is located. However, the original EIR for LA-5 stated that Block 878 “has not been very productive for commercial fishing.” Specifically,

The total catch in Block 878 in 1981 amounted to approximately 235,000 pounds of fish and invertebrates. Even though it represented a four-fold increase over the 1976-77 catch, it still amounted to only one-fourth of the average catch per block in the San Diego area. Blocks 860 and 861, to the north of this block are, however, much more productive, partly due to the presence of rock substrate, kelp beds and other fish habitat. (EPA 1987)

Kelp Harvesting

Kelp harvesting operations also occur in the proposed project area. Giant kelp (*Macrocystis pyrifera*) is found all along the western coast of the United States. Off the southern California coast, kelp is found on rocky substrate in wave-exposed areas at depths of 20 to 120 feet. Areas

of particular kelp abundance in the San Diego region include La Jolla Point and Point Loma (California Marine Life Protection Act Initiative 2009). Kelp harvesting has occurred in California since 1911 and involves the use of cutter barges, which harvest the upper kelp canopy down to a depth of about 4 feet below the water surface. Kelp beds are located near some of the offshore placement sites and beaches. Kelp forests are not only important to sport fishermen, commercial fishermen, and kelp harvesters; they are also important to recreational divers, photographers, and tourists who value them for aesthetic reasons (CDFG 2004).

A number of factors can influence the vitality of kelp beds. Grazers such as the halftoon, opaleye, perch, sea urchins, and various crustaceans can affect the growth of kelp. Storms frequently pull kelp plants off the substrate. Human-caused environmental stress is brought about by pollution and sedimentation from power plants, sewage discharge, and coastal development practices (CDFG 2004). Sedimentation of the rocky bottom has also been known to retard kelp growth and bury young plants, preventing development and reproduction (Glantz 1999).

The harvesting of kelp in the state is regulated by CDFW. The State of California has imposed a number of restrictions on harvesting activities, both commercial and recreational. In recent years, the alginate industry has considerably reduced its demand for California kelp, and commercial kelp harvest (in weight) decreased by 96 percent from 2002 to 2007. The dramatic decrease in kelp harvesting after 2005 resulted from the departure of a large kelp harvesting company, which moved its operations overseas (California Marine Life Protection Act Initiative 2009).

Two kelp beds, one located from the California/Mexico international border to southern tip of San Diego Bay, and one located from the southern tip of San Diego Bay to the southern tip of Point Loma, are considered open, which means they may be harvested by anyone with a kelp harvesting license. Kelp beds at Point Loma, Mission Bay, Scripps Pier, and the San Dieguito River to middle of Loma Alta Lagoon at south Oceanside are considered leasable and provide the exclusive privilege of harvesting to the lessee (California Marine Life Protection Act Initiative 2009). Recent CDFW records suggest that Knocean Sciences, a producer of kelp oil and kelp concentrate, has an exclusive harvest agreement for kelp near Point Loma at a rate of \$3.00 per wet ton (CDFG 2012).

Recreational Fishing and Diving

A wide range of marine recreational fishing and diving opportunities exist along the San Diego coast. These include surf and shoreline fishing, pier fishing, party boat fishing, private boat fishing and diving, and skin/SCUBA diving. According to NOAA (2012), the direct economic impact of recreational fisheries in California totaled more than \$2.0 billion in 2009, with over \$1.0 billion more in value-added impacts. Of the \$2.0 billion in direct economic impact, durable

equipment accounted for \$1.5 billion, shore activities such as pier and beach fishing accounted for \$263 million, charter boats accounted for \$133 million, and private boats accounted for \$113 million. Recreational fisheries employ nearly 12,000 people in the state.

The most common target species for beach fishing were barred surfperch, yellowfin croaker, opaleye, and jacksmelt. Fishing from man-made structures target Pacific mackerel, Pacific sardine, northern anchovy, queenfish, and jacksmelt. Rented and chartered boat fishing targets offshore and pelagic species, especially mackerel, croaker, bass, and rockfish (California Marine Life Protection Act Initiative 2009). There is a small contingent of operators that specialize in half-day and 1-day charters that typically fish the nearshore areas and kelp beds. These operators target sand and kelp bass and California halibut. Oceanside Harbor has a few boats that specialize in this fishery while Mission Bay and San Diego Bay have a large charter fleet. Fishing occurs year-round in the study region, although effort markedly increases in the summer months, peaking in July. According to estimates produced by CDFW's California Recreational Fisheries Survey, over 40 percent of fishing trips occur in the months of June, July, and August (California Marine Life Protection Act Initiative 2009).

Parnell et al. (2010) conducted angler interviews in San Diego County and found differences in fishing behavior among recreational fisherman originating from the two different locations (landings). Results of the Parnell et al. (2010) study indicated fisherman launching in San Diego Bay primarily fished San Diego Bay or offshore of Point Loma, the latter primarily targeting demersal fish within the kelp forest. In contrast, fisherman launching in Mission Bay primarily fished in Mission Bay or offshore of La Jolla, primarily targeting more transitory pelagic species just offshore of the kelp forest to the edge of the nearshore shelf outside of the kelp forest. Recreational catch in San Diego from Commercial Passenger Fishing Vessel data show that an average of 54,213 anglers participated in the recreational fishery in San Diego between 2003 and 2007, catching an average of 209,540 fish.

Sport diving and spearfishing activities mostly occur in the nearshore waters, and diving trips in San Diego in the early 1990s numbered about 30,000 per year. It is assumed that this rate has increased as the rate of Professional Association of Diving Instructors (PADI) certification has increased substantially since 1990 (NMFS 1991; PADI 2012). Most diving occurs in habitats rich in marine life, especially kelp beds and rocky reefs. Much of the diving in San Diego involves trips to locations only accessible by boat, including offshore kelp beds, the vessels intentionally sunk as artificial reefs in "Wreck Alley" off of Mission Beach, and even offshore islands and banks. Shoreline diving is also popular.

The most common local beach diving locations include the submarine canyon off La Jolla Shores (where dive instruction classes are typically taught), La Jolla Cove (due to the abundant undersea

life there attributable in part to the area's protected underwater reserve status), and numerous other sites along the coast from La Jolla to Oceanside where public access to nearshore reefs is convenient. Photography, spearfishing for kelp bass and halibut, and diving for spiny lobsters are three of the more popular diving activities. Spearfishing can involve either skin diving (also known as snorkeling or free diving) or SCUBA gear. In addition to California spiny lobster, divers also harvest rock scallops, marine snails and limpets, various species of clams, and in recent years, Humboldt squid (California Marine Life Protection Act Initiative 2009). Sport diving for lobster usually involves SCUBA diving as the lobster must be captured by hand without the use of snares or any other tools, and individual lobster are often found under reef ledges, in crevices between rocks, or in other difficult to access areas. Some lobster diving takes place at night, as lobsters are more likely to leave shelter to forage and are thus easier to capture by hand. The number of lobsters caught in southern California reached an estimated peak of 12,000 in 2002, after which the number of lobsters decreased to approximately 8,000 in 2005. By 2007, the estimated number of lobsters caught by recreational divers was 10,000 (California Marine Life Protection Act Initiative 2009). In the early 1990s, diving for fish and/or lobster occurred at a rate of about 1,000 trips per month, season permitting, although that number may be higher now (Neilson 2011). The average number of divers varies according to season, weather, and sea conditions (NMFS 1991).

3.13.2 CEQA THRESHOLDS OF SIGNIFICANCE

The primary focus of this impact analysis is the socioeconomic effect to commercial fisheries, kelp harvesting, and recreational fishing/diving from a NEPA perspective. There would be no substantial difference in effect based on season of construction because this analysis considers the larger, regional fishery and its long-term health. Potential impacts are considered over time with no particular start date. As stated in Section 3.13.1, NEPA requires consideration of "economic" and "social" effects (40 CFR Section 1508.8) but CEQA only requires evaluation of population, housing, social, and/or economic effects such that they may result in physical impacts, or an evaluation as to whether economic and/or social effects may determine the significance of physical changes. No housing would be constructed with this project and no increase in population is anticipated, so there is no applicable CEQA analysis. Furthermore, economic and social effects would not create physical impacts on the environment, and the significance of environmental effects is not influenced by economic and social effects. Growth inducement is discussed in Section 6.2. NEPA does not require explicit definition of significance criteria. Issues related to environmental justice are discussed in Section 3.13.6 of this report.

3.13.3 ENVIRONMENTAL CONSEQUENCES

Overall, the social and economic effects of the action would be beneficial. The lagoon represents a valuable coastal wetland with substantial biological and ecological resources. It provides habitat for sensitive plants and wildlife, including nursery habitat, as well as over 7 miles of recreational trails within the reserve. The potential reuse of material would provide beaches with wider and larger sand areas, and beaches with exposed cobblestones would be covered with sand. Expansive sandy beaches provide greater recreational opportunities and opportunity for public access, and enhance tourism in the region. Public property and infrastructure would have additional protection from wave action and storm events while sand remains at the reuse/placement locations.

Lagoon Restoration

Alternative 2A

Temporary

It is assumed that the design and construction work associated with the lagoon restoration would be by civilian firms that would largely draw their employees from a labor pool within San Diego County. However, dredge personnel may come from outside the region since many specialized dredgers are based on the east coast. Given the temporary nature of the construction, no increase in population would occur from workers relocating to the area, and no increase in demand for local housing is anticipated to occur. Most of the construction work would be performed by workers residing within commuting distance of the lagoon, such that the demand for temporary construction worker housing would be minimal.

During construction, localized, temporary socioeconomic impacts could potentially accrue due to the proximity of sensitive receptors (such as residential areas) to the limits of lagoon restoration construction. These localized socioeconomic impacts may include changes to community character and could result from construction noise, a temporary degradation of air quality, or a decrease in traffic LOS and/or accessibility to socially important land uses. Temporary impacts to employment and local economy would be slight, but beneficial, and the overall temporary impacts to employment, income, population, and housing would be less than significant.

Permanent

With regard to permanent impacts, the lagoon restoration would not result in a permanent population increase or change in housing demand. Economic output as a result of lagoon

restoration is anticipated to be beneficial, although slight, as community members and visitors would have a new opportunity to witness and enjoy a more dynamic and diverse lagoon ecosystem. Therefore, impacts on existing regional population and associated housing, employment rates, and regional economy would largely remain unchanged as a result of the lagoon restoration and would be less than significant.

Alternative 1B

While the details of design and construction activities would be slightly different from Alternative 2A, the impacts of Alternative 1B on existing regional population and associated housing, employment rates, and regional economy would largely remain unchanged and would be less than significant.

Alternative 1A

While the details of design and construction activities would be slightly different from Alternative 2A, the impacts of Alternative 1A on existing regional population and associated housing, employment rates, and regional economy would largely remain unchanged and would be less than significant.

No Project/No Federal Action Alternative

No adverse impacts would occur to local socioeconomics as a result of the No Project/No Federal Action Alternative. However, the No Project/No Federal Action Alternative would not provide an economic benefit and the lagoon would remain in its current state. Recreational opportunities and tourism value would not experience a beneficial impact, and no impact would result.

Materials Disposal/Reuse

Previous interactions with commercial fishermen and their representatives during the 2001 and 2012 RBSPs have suggested that beach replenishment and offshore materials removal/disposal may result in impacts to three areas of stakeholder concern. These concerns focus on the potential for loss of resources and income and can be summarized as follows:

- Sand placed on the beaches could move from the beaches onto sensitive habitat areas, causing immediate loss of commercial resources associated with these habitats (e.g., lobster, crab, urchin), effectively excluding this area from fishing for some period of time, otherwise known as creating a “preclusion area.” Additionally, turbidity plumes

from the project would cause commercial resources to move from the area for some period of time, effectively causing area preclusion.

- Movement of sand from the beaches onto sensitive subtidal habitat areas could adversely affect nursery habitat, causing significant long-term damage (through population reduction) to the fishery.
- Materials transport and placement operations could lead to loss of fishing gear and equipment as well as limit access to fishing areas.

These three concerns (area preclusion, adverse effects to nursery habitat, and gear loss/limit access) are each discussed below. All concerns are applicable to materials placement activities in the offshore for stockpiling, nearshore at Cardiff, and onshore on-beach in the event barges are used. Materials disposal/reuse on-site would not affect commercial fisheries. Turbidity and nearshore habitat loss concerns are less applicable to the offshore disposal at LA-5 for the materials placement option under Alternative 1A. Likewise, gear conflicts and access concerns are less applicable to onshore on-beach materials disposal/reuse depending on the use, frequency, and route of materials barges.

Alternative 2A

Commercial Fishing Resources/Area Preclusion

Materials disposal/reuse activities would be similar to those assessed for the 2012 RBSP, although less expansive in geographic scope with respect to individual onshore beach disposal sites and would include fewer offshore sites. Based on the analysis in the 2012 RBSP EIR/EA, the level of economic activity associated with the commercial fishery in San Diego County, and the various scenarios described in Chapter 2, significant regional or localized impact is unlikely in the San Diego area or the North County subarea fisheries. Impacts may be felt at the individual fishing operation level as a result of displacement from favored fishing locations; however, the individual operational level impacts cannot be accurately quantified with the currently available data.

Though the materials disposal/reuse process would extend for approximately 10 months, only a small area of the 60-mile coastline would be affected at any one time. That is, with (possibly) two tugboats and four barges, with up to 2,500 cy of sand on each barge, operational for the project, the actual area that would be affected at any point in time would be localized and not preclude other areas from being fished. Additionally, as described in Section 2.10, SELC is committed to coordinating barge operations with USCG so that, via timely notification, areas can be fished the maximum amount of time and only the area of active dredging would be restricted

(PDF-59). Thus, **no significant long-term or substantial adverse preclusion impacts would occur as a result of the dredging operations.**

Direct impacts from materials placement would not cause significant impacts to the lobster, urchin, squid, sheephead, or halibut fisheries. Turbidity and siltation from offshore disposal would be localized and short term (Sections 3.2 Hydrology and 3.4 Water and Aquatic Sediment Quality). The area that would be affected by turbidity and siltation represents a very low percentage of available habitat, and direct placement activity at any one location would be limited to offshore SO-5/SO-6 and nearshore Cardiff. After stockpiling, offshore sites may remain at slightly different elevations from surrounding areas but would be gradually sloped and are not expected to affect lobster movement or distribution. Therefore, while increases in turbidity and siltation from disposal at the offshore stockpile sites and/or nearshore Cardiff would occur in the short term, no long-term significant impacts are expected to commercial species. Localized decreases in visibility due to turbidity from disposal or from the beaches could affect diving conditions. This effect would be localized and of limited duration, and would not be significant to the urchin fishery. Turbidity and siltation from disposal may affect squid spawning sites, but these impacts would be localized and short term, and would affect only a small percentage of available spawning areas along the coast. No long-term significant impacts are expected to the commercial squid fishery. Redistribution of sand from the beaches could temporarily cover some low-lying reef areas, causing some short-term loss of potential sheephead habitat. However, sheephead are highly mobile and the amount of low-lying reef that would be affected is small and the loss temporary. Therefore, **although some temporary impacts to low-lying reefs may occur, this effect to sheephead would be considered less than significant and not substantially adverse.**

California halibut utilize the nearshore area and lagoons as feeding and nursery areas. The proposed project could potentially affect this species. The project has been designed to avoid significant long-term impacts to the coastal lagoons (in fact, it is meant to improve the lagoon ecosystem) so no impacts to the lagoon nursery areas are expected. Some areas of the nearshore may be temporarily covered by sand moving off the beaches onto the subtidal area. This is not significant to halibut as their habitat is the sand bottom and they are well adapted to changes in nearshore sand levels. Any dislocation of halibut due to turbidity or sand movement would be localized and temporary, and is considered less than significant. **The impacts of Alternative 2A to commercial fishing resources and effects to area preclusion are considered less than significant and not substantially adverse.**

Gear Loss

Vessel traffic and barge operations have the potential to conflict with traps. To reduce the potential for trap loss and conflict, and to minimize impacts associated with the incompatibility of materials placement and fishing activities, a 300-foot buffer would be designated around the lane designated for barges to use to reach the designated disposal/reuse areas. Global Positioning System (GPS) tracking would be employed to track disposal activity (PDF-62). In the event that gear is damaged or destroyed inside of the identified 300-foot buffer, compensation would be the responsibility of the contractor. As described in Section 2.10, SELC has committed to coordination with USCG and the dredge operator to minimize, to the extent possible, gear conflict and disruption of fishing locations (PDF-59). **Potential impacts of Alternative 2A on commercial fishing gear would be minimized by these processes, and would, therefore, be less than significant and not substantially adverse.**

Nursery Habitat

Disposal activities have been designed to minimize effects on kelp and kelp habitat. Disposal at offshore sites would cause localized turbidity and siltation. However, the placement sites have been designed to provide a minimum 500-foot buffer zone from kelp beds and potential kelp habitat (PDF-55). This buffer zone is judged to be sufficient as the distances from the disposal sites would generally be much greater than 500 feet from these resources; the duration of turbidity would be intermittent and reach potential resources for a few days at most. Therefore, the impact is considered less than significant. **Turbidity from the beach sites and subsequent redistribution of the beach sand to the nearshore is anticipated to be less than significant and not substantially adverse.**

Impacts to the recreational fishing and diving include potential loss of resources, exclusion from fishing/diving areas, and decreased visibility for divers due to turbidity plumes. Sport diving for lobster and fishing for halibut in the nearshore area could be affected by the project as sand moves off of the disposal sites. Turbidity from the beaches and presence of disposal machinery would preclude use of small areas for short periods but adjacent areas would remain available for use. In the longer term, access for shore diving and surf fishing may improve with the placement of sand on the beaches. Sport fishing boats could be affected by disposal operations and turbidity plumes from the beaches. Some loss of sport fishing areas would occur during actual disposal operations but this area would be substantially less than the available nearshore areas for sport fishing and short term in nature at individual disposal locations. **Potential direct and indirect impacts of Alternative 2A on nursery habitat, kelp beds, turbidity, and recreational fishing would be less than significant and no substantial adverse impacts would occur.**

Alternative 1B

Impacts under Alternative 1B would be similar to those described for the proposed project. Due to the decrease in the volume of materials for disposal/reuse, there would be fewer trips required, less sand movement, fewer turbidity issues, and a possible shorter timeframe for these activities, making impacts of Alternative 1B altogether less, albeit slightly. **Impacts of Alternative 1B on commercial fishing resources and effects to area preclusion are considered less than significant. No substantial adverse impacts would occur.**

Alternative 1A

Impacts under Alternative 1A, would be similar to those described for the proposed project. However, concerns regarding turbidity, habitat loss, and nursery habitat loss with regard to nearshore/onshore activities would not occur. Although gear conflict concerns surrounding offshore disposal would remain, there are poor fishing conditions surrounding LA-5 as disclosed earlier in this document, and **impacts to commercial fishing would be less than significant. No substantial adverse impacts would occur.**

No Project/No Federal Action Alternative

No adverse impacts would occur to commercial fishing resources and area preclusion, gear loss, and nursery habitat as a result of the No Project/No Federal Action Alternative, and **no impact would result.**

3.13.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

A number of features have been incorporated into the project to avoid and/or minimize impacts to commercial fisheries and recreational uses during materials placement. These features include establishing buffers around sensitive resources and active construction access areas, as well as coordination with USCG to minimize conflicts during ocean-based activities. No unavoidable adverse effects or significant impacts on socioeconomics would occur as a result of implementation of any of the alternatives during lagoon restoration and/or materials disposal/reuse; no mitigation measures are required.

3.13.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA: Effects of the proposed project on socioeconomics would be largely beneficial in terms of employment and economic output; no impacts are anticipated to population or housing. In addition, there would be no long-term significant impacts to commercial fisheries.

NEPA: The proposed project would not have a substantial adverse impact on socioeconomics. Issues related to environmental justice are discussed in Section 3.13.6 of this report.

3.13.6 ENVIRONMENTAL JUSTICE ANALYSIS

Protection of Children from Environmental Health Risks and Safety Risks

On April 21, 1997, President Clinton signed Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (62 *Federal Register* 19885 (1997)). The policy of the executive order states that:

A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because: children's neurological, immunological, digestive, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weights than adults; children's size and weight may diminish their protection from standard safety features; and children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves. Therefore, to the extent permitted by law and appropriate, and consistent with the agency's mission, each Federal agency:

- (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and
- (b) ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

To assess the potential for impacts to disproportionately accrue to children, it is important to document those land uses surrounding the lagoon and disposal sites that are likely to contain a higher proportion of children throughout the course of a day. For the purposes of this analysis, children are considered those individuals who are under 18 years of age and the sensitive land uses identified include schools, parks, and daycare centers within 0.5 mile from the proposed project sites. It is considered that health and safety risks to children, if they were to occur as part of the restoration and disposal activities, would occur within these buffer zones.

Table 3.13-7 presents the child-focused land uses near the proposed lagoon and disposal/reuse sites for all alternatives and scenarios. Existing land use maps were used to identify these land uses. Schools and parks are relatively well documented on such maps. Daycare centers vary in

**Table 3.13-7
Schools, Parks, and Daycare Centers within 0.5 Mile of San Elijo Lagoon and Materials Placement Sites Study Areas**

Geography	Schools	Parks	Daycare Centers
San Elijo Lagoon Study Area	The Rhoades School	Cardiff State Beach	Solana Beach Child Development Center
	Solana Vista Elementary Skyline Elementary Earl Warren Middle School Sanderling School AGVI Academy for Gifted Children	Tide Beach Park Glenn Park San Elijo State Beach Solana State Beach	Encinitas Country Day School – Temple Solel
Materials Disposal Sites	Cardiff	Glenn Park Solana State Beach Tide Beach Park	
	Moonlight	Stonesteps Beach Access Orpheus Park Cottonwood Creek Park Oakcrest Park East Sea Cliff County Park Encinitas Viewpoint Park Swamis Seaside and Beach Parks H, I, and J Street Viewpoints D Street Beach Access Mildred Macpherson Park Leucadia Beach Moonlight Parcels Leucadia Roadside Park	
	Solana Beach	Fletcher Cove Park North Bluff Preserve Cardiff State Beach North Seascape Surf Beach Park Dog Beach Del Mar	Solana Beach Child Development Center
	Leucadia	Beacon's Beach Leucadia Oaks Park Grandview Beach Leucadia Roadside Park	Lovechild Center
	Torrey Pines	Torrey Pines State Reserve	

Source: Google Earth 2012

size and can include in-home daycare providers, stand-alone institutional centers, or larger centers associated with another facility such as a church or larger school. Larger facilities or those associated with other facilities are typically more commonly documented on land use maps. Smaller facilities may not be included in mapping, but these are not necessarily dedicated child-focused land uses and are more similar in nature to residences than schools with respect to the number of children present on-site.

Areas of construction and disposal/reuse would be restricted during project implementation for safety reasons and no long-term health and safety effects would occur after the onshore disposal areas were reopened for public use. Under NEPA, to which Executive Order 13045 applies, no short-term, substantially adverse noise impacts during construction are likely to extend into neighborhoods off-site. There is no evidence that children are likely to be subject to disproportionate impacts through learning disruption or subject to health and safety effects. In summary, under NEPA, no disproportionate impacts to environmental health risks and/or safety risks to children are likely to occur with project implementation.

Environmental Justice

This section summarizes potential human health, economic, and social impacts from sand replenishment with respect to issues of environmental justice, as mandated by Executive Order 12898. The “Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” issued on February 11, 1994, requires that the relative impacts of federal actions on minority populations (including Native American tribes) and low-income populations be addressed to avoid the placement of a disproportionate share of adverse impacts of these actions on these groups. On April 21, 1995, the Secretary of Defense submitted a formal environmental justice strategy and implementation plan to EPA.

To comply with Executive Order 12898, this EIR/EIS process included gathering demographic and income information from the U.S. Census Bureau to identify areas of low-income and/or high minority populations in the areas contiguous with the lagoon and disposal/reuse sites that would potentially be exposed to impacts, as well as geographically dispersed populations that may be affected by impacts to resources within the study area. Impacts to these areas and resources were then evaluated with regard for disproportionate impacts to low-income and minority populations.

As discussed in Section 3.13.1, only one census tract (173.04), located in Solana Beach, has a percentage of minority residents that suggests that it may be a community of concern with regard to proximal and disproportionate human health, economic, and social impacts. (Upon closer analysis, only block group 2 [173.04.02] within this census tract has a percentage of minority

residents over 50.0 percent. Block group 2 includes the area bounded by Stevens Avenue, Via de la Valle, I-5, and Lomas Santa Fe Drive.) Native American stakeholders and tribal members may be disproportionately affected by impacts to cultural resources.

Environmental Consequences

Overall, the human health, economic, and social impacts associated with the project would be beneficial. Under NEPA (to which Executive Order 12898 applies), some temporary substantial adverse impacts would occur during construction activities, and a permanent substantially adverse visual impact would occur (Alternative 2A). The following sections recapitulate the impacts with a human health, economic, or social nexus that would remain substantially adverse after mitigation, as well as an evaluation as to whether the impact would accrue disproportionately to environmental justice populations.

Lagoon Restoration

Alternative 2A

Temporary

As stated in Section 3.9.3, visitors at the San Elijo/Kilkenny vista point, users of the trail system within San Elijo Lagoon, and visitors to the Nature Center would experience a strong visual contrast during construction because of the overall change and likely perceived degradation in visual character. Since these visitors would have higher scenic expectations, the contrast would be strong as a result of construction activities. Overall, the construction phase would represent a temporary, but significant change in the visual quality and character of the lagoon for key viewers. The temporary impact to trail users and vista point viewers would be substantial and adverse.

As stated in Section 3.9.3, construction of the new inlet and CBFs on either side would be highly visible and a contrast to the current beach character. The CBFs would consist of two relatively short and low rock features along the outer reach of the tidal inlet channel. While efforts would be made to soften the appearance via naturalized finish and partial to full burial of the feature (depending on the season), the CBFs would introduce a man-made linear feature perpendicular to Coast Highway 101 extending several feet toward the ocean and the contrast would be strong for some beach users. Construction of the new inlet and CBFs would result in substantial and adverse impact.

With regard to impacts to visual resources, the users associated with adversely affected key views are not predominately minority and/or low-income populations. The affected vista point, trails, and Nature Center attract visitors from throughout the region and impacts would not disproportionately accrue to environmental justice populations who may visit. Furthermore, demographic analysis suggests that nearby populations to these key views are not environmental justice populations. Visual impacts associated with constructing and establishing the inlet and CBFs would accrue similarly, as the beach draws visitors from throughout the region and nearby populations are not considered environmental justice communities; substantial and adverse visual impacts would not accrue disproportionately to environmental justice populations.

As stated in Section 3.10.3, the road along Coast Highway 101 across the mouth of the lagoon would be demolished and replaced with the proposed bridge in two parts. Traffic analyses suggest that the daily segment operations on the roadways affected by the bridge lane closure would continue to operate at acceptable LOS C or better with the following exceptions:

- Coast Highway 101 – South of Chesterfield Drive (LOS E)
- Lomas Santa Fe Drive – Solana Hills Drive to I-5 (LOS F)

The degradation of these two roadway segments would exceed the allowable thresholds during bridge construction activities and would be considered a temporary substantially adverse impact.

With regard to traffic impacts, Coast Highway 101 is a transportation corridor used by regional residents and a degradation of LOS along this corridor would affect all regional users equally, regardless of race, ethnicity, or income. Furthermore, nearby residents along this transportation corridor are not considered environmental justice populations based on demographic analysis. The portion of Lomas Santa Fe Drive between Solana Hills Drive and I-5 that would experience a degradation in LOS is in proximity to census tract 173.04 (as well as its block group 2, which represents a more specific geography for the identified minority community in Solana Beach). This transportation corridor is likely used by the nearby environmental justice community as residents travel to/from their homes. However, this portion of Lomas Santa Fe Drive is also likely used by non-environmental justice communities north of the corridor, as well as regional users traveling along Lomas Santa Fe Drive who may be visiting Fletcher Cove or other portions of Solana Beach. Impacts occurring along Lomas Santa Fe Drive would accrue to nearby environmental justice populations, but this accrual would not be disproportionate; an environmental justice impact would not occur.

Permanent

As stated in Section 3.9.3 and above, the establishment of a new inlet and CBFs on either side would be highly visible and a contrast to the current beach character. The new inlet and CBFs would result in a substantial and adverse impact.

Visual impacts associated with the permanent CBFs would accrue similarly, as the beach draws visitors from throughout the region and nearby populations are not considered environmental justice communities; substantial and adverse visual impacts would not accrue disproportionately to environmental justice populations.

Alternative 1B

Temporary

Similar to Alternative 2A, visual impacts would be substantial and adverse for trail users and vista point users due to the multi-year duration of construction. However, the affected vista point, trails, and Nature Center attract visitors from throughout the region and impacts would not disproportionately accrue to environmental justice populations who may visit. Furthermore, demographic analysis suggests that nearby populations to these key views are not environmental justice populations.

LOS degradation of two roadway segments would exceed the allowable thresholds during bridge retrofit activities and would be considered a temporary substantially adverse impact. However, Coast Highway 101 is a transportation corridor used by regional residents and a degradation of LOS along this corridor would affect all regional users equally, regardless of race, ethnicity, or income. Furthermore, nearby residents along this transportation corridor are not considered environmental justice populations based on demographic analysis.

Permanent

The details of design would be slightly different from Alternative 2A and no permanent, adverse human health, safety, or social impacts would remain after mitigation.

Alternative 1A

Temporary

LOS degradation of two roadway segments would exceed the allowable thresholds during bridge retrofit activities and would be considered a temporary substantially adverse impact. However, Coast Highway 101 is a transportation corridor used by regional residents and a degradation of LOS along this corridor would affect all regional users equally, regardless of race, ethnicity, or income. Furthermore, nearby residents along this transportation corridor are not considered environmental justice populations based on demographic analysis.

Permanent

The details of design would be slightly different from Alternative 2A and no permanent, adverse human health, safety, or social impacts would remain after mitigation.

No Project/No Federal Action Alternative

No adverse impacts would occur to human health, safety, or social values as a result of the No Project/No Federal Action Alternative.

Materials Disposal/Reuse

Alternative 2A

Temporary

No temporary adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values during materials disposal/reuse associated with Alternative 2A. Thus, no temporary substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 2A.

Permanent

No permanent adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values as a result of materials disposal/reuse associated with Alternative 2A. Thus, no permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 2A.

Alternative 1B

No temporary or permanent adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values as a result of materials disposal/reuse associated with Alternative 1B. Thus, no temporary or permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 1B.

Alternative 1A

No temporary or permanent adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values as a result of materials disposal/reuse associated with Alternative 1A. Thus, no temporary or permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 1A.

No Project/No Federal Action Alternative

No adverse impacts would occur to human health, safety, or social values as a result of the No Project/No Federal Action Alternative. Thus, no temporary or permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of the No Project/No Federal Action Alternative.

Avoidance, Minimization, and Mitigation Measures

No substantial adverse impacts would accrue disproportionately to environmental justice communities; no mitigation measures are required.

Level of Impact after Mitigation

NEPA: The proposed project would not have an adverse impact on environmental justice.

3.14 PUBLIC SERVICES AND UTILITIES

This section summarizes the public services and utilities in the project study area, including San Elijo Lagoon and proposed materials placement sites identified for potential materials disposal/reuse. Public utilities and infrastructure can include wastewater and sewer outfalls/access/structures, solid waste disposal sites, natural gas lines, electrical transmission lines, and utility poles. Public services that could be potentially impacted by the project include lifeguard operations at local beaches. This restoration project does not increase the demand for public services or utilities, so this analysis focuses on the potential for disruption of service and infrastructure. Information for this section was compiled, summarized, and incorporated from project field surveys and service provider information as referenced in the text.

3.14.1 AFFECTED ENVIRONMENT

A variety of utility infrastructure traverses the project study area. Multiple service providers, jurisdictions, and agencies own and maintain these utilities, such as the cities of Encinitas and Solana Beach and San Diego Gas & Electric (SDG&E). This existing utility infrastructure is described below.

The public service at issue is lifeguard service and associated facilities, such as lifeguard towers, at the local beaches proposed for materials placement. Other public services, such as libraries, schools, and other similar services would not be affected by the proposed project and are not discussed further.

San Elijo Lagoon Study Area

Sewer

The San Elijo Water Reclamation Facility (SEWRF) is located just north of the project study area near the central basin and west of I-5. The SEWRF is a publicly owned wastewater treatment plant and water recycling facility that handles mostly domestic waste and is permitted to discharge up to 2.48 million gallons per day of tertiary treated wastewater, and up to 5.25 million gallons per day of secondary treated wastewater to the Pacific Ocean through the San Elijo Ocean Outfall. The San Elijo Ocean Outfall is a 30- to 48-inch-diameter reinforced concrete pipe, which extends from the SEWRF to 1.5 miles offshore for the purpose of discharging treated wastewater (SEJPA 2013). The San Elijo Ocean Outfall passes through the northern corner of the central and west basins of San Elijo Lagoon from Manchester Avenue and exits to the ocean just south of the mouth of the lagoon.

Various other sewer lines are located within the project study area. A 12-inch-diameter Solana Beach force main sewer line runs north-south between the SEWRF toward an abandoned treatment plant and the existing Solana Beach Pump Station. The sewer main is buried at a depth of approximately 45 feet below the lagoon surface. The Solana Beach Pump Station is located within the southern portion of the project study area where the west and central basins meet. Sewer lines and associated manholes are located along the northern border of the project study area in Manchester Avenue. Sewer manholes are also concentrated along the north side of the western border of the west basin and along the I-5 ROW. Additionally, a sewer line (and associated manholes) bisects the northern corner of the east basin. Sewer infrastructure is also associated with the north end of the Coast Highway 101 bridge and ROW within the project study area. The former sewage pond in the central basin is no longer owned or operated by a service provider.

Water

Water mains are located north of the project area, generally along Manchester Avenue and its associated ROW. Water mains are also located along the northern portion of the Coast Highway 101 bridge within the project study area. No other substantial water infrastructure is located within the lagoon basins.

Electricity

SDG&E provides electrical service to the San Diego region, including the project study area. Electrical transmission corridors traverse San Elijo Lagoon in the central and east basins. In the central basin, a 69-kilovolt (kV) overhead electrical line runs parallel to the railroad ROW, passing north and south throughout the length of the lagoon. Another 69-kV overhead electrical line traverses the lagoon in the east basin, forming an L-shape configuration south of Manchester Avenue. This line connects with another transmission corridor in the far eastern portion of the basin.

Natural Gas

SDG&E is the natural gas service provider for most of the San Diego region, including the project study area. Two underground gas lines run through the project study area; one in the central basin and the other in the northeast corner of the east basin. A 12-inch-diameter natural gas line travels north-south through the central basin, immediately east of the railroad tracks. Valves associated with this line are located immediately outside of the project study area to both the north and south. Another natural gas line traverses north/south near the very eastern

boundary of the project study area in the east basin. No restoration activities are anticipated to take place near the gas line in the east basin so this gas line is not discussed further.

Solid Waste

In the areas surrounding the project study area, the City of Encinitas has an exclusive franchise agreement with EDCO Waste and Recycling Services to provide solid waste collection services for both residential and commercial customers. The City of Solana Beach contracts solid waste services to two companies, Coast Waste Management Inc. and EDCO Waste and Recycling Inc., which provide service to residential and commercial accounts, respectively (Solana Beach 2013). There are no active or closed solid waste disposal sites within the project study area.

Lifeguard Services

Lifeguard services are not provided within the Reserve area as swimming, wading, diving, fishing, watercraft, and other water-based recreation are not permitted within lagoon waters. The new inlet would pass through Cardiff Beach where lifeguard services are provided. State Lifeguard Tower No. 6 is located south of the existing San Elijo lagoon mouth and is pulled into the adjacent parking lot during the winter season. Lifeguard Tower No. 5 is located farther to the north with a viewing platform of approximately 15 feet high and is not moved seasonally.

Materials Disposal/Reuse Study Area

Public utility infrastructure is not typically located within the onshore sandy or rocky beach areas as the location is too volatile. The public structures associated with the materials placement beach locations are lifeguard towers. The offshore and nearshore materials placement locations are located on the ocean floor where public utilities or structures do not exist, with the exception of an ocean outfall. Each materials disposal/reuse site is briefly described below. The information presented below is referenced from the 2012 RBSP EIR/EA.

Cardiff

The 30-inch-diameter San Elijo Ocean Outfall is buried just south of the mouth of San Elijo Lagoon. The outfall is buried within the middle portion of the proposed onshore Cardiff materials placement site.

Immediately north of the materials placement site is commercial development known as Restaurant Row, which is located next to the beach, and a lifeguard access ramp that extends to the beach. State Lifeguard Tower No. 6, which is located south of the existing San Elijo lagoon

mouth, is pulled into the adjacent parking lot during the winter season. Lifeguard Tower No. 5 is located south of the development at the north end of the placement site. This tower is not moved seasonally, and its viewing platform is approximately 15 feet high.

Leucadia

The main access point to Leucadia, which is also known as Beacon's Beach, is located at the end of Leucadia Boulevard. A lifeguard tower is placed at Beacon's Beach every summer. The bluffs behind Beacon's Beach are known to be unstable with potential for landslides without seawalls providing protection. Numerous seawalls have been built between Grandview and Beacon's (including both permitted and unpermitted structures).

Moonlight Beach

One 36-inch-diameter, one 60-inch-diameter, and three 48-inch-diameter storm drain pipes are located at the end of B Street at Moonlight Beach. The City of Encinitas has excavated several feet around the outlets to expose the pipes and allow proper drainage flow.

A permanent lifeguard stand is located at the south end of Moonlight Beach at C Street and a temporary tower is placed at the north end of the beach at B Street. Both are situated on the berm above the low tide beach, and neither tower is moved during the winter season. Multiple concrete and wooden staircases provide public access from the top of the bluff to the beach.

Solana Beach

A 60-inch-diameter energy dissipater storm drainpipe is located at the west end of Plaza Street immediately adjacent to the Fletcher Cove access ramp. Another substantially smaller storm drain outlet is located at Seascapes Surf, south of Fletcher Cove. This storm drain emerges from the bluff face at approximately 9 to 10 feet above msl. None of the drain pipes are directly on the beach.

Four temporary lifeguard towers are located near this materials placement site: one at Fletcher Cove, a Junior Lifeguard tower at 350 S. Sierra Avenue, one at the base of the Seascapes Surf access point, and one at 825 S. Sierra Avenue. All of the towers are annually placed on the beach the weekend before Memorial Day and removed the weekend after Labor Day. In the City of Solana Beach, there are eight vertical access points (four public, four private) that provide access to the beach below (City of Solana Beach 2011).

Torrey Pines

Three permanent lifeguard towers are on the Torrey Pines material placement site. State Lifeguard Tower No. 1 is the southernmost tower, located about 100 yards south of the beach access road. Towers No. 2 and No. 3 are located farther north. Riprap has been placed on the beach to protect the road. No additional structures or utilities currently exist within the shoreline area of the proposed materials placement site.

SO-5/SO-6

Sites SO-5 and SO-6 are located offshore. SO-5 does not contain public utilities or structures within its boundaries. The San Elijo Ocean Outfall passes east-west south of SO-6 at a depth of -47.9 feet mean lower low water (MLLW).

LA-5

Ocean disposal site LA-5 is located many miles offshore and does not contain public utilities or structures within its boundaries.

3.14.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to public services and utilities would occur if implementation of the proposed project would:

- A. Result in the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design the construction of which could cause significant environmental effects.

The CEQA threshold of significance for public services and utilities was derived from a combination of thresholds listed in Appendix G of the CEQA Guidelines and thresholds used in the 2012 RBSP EA/EIR (SCH #2020051063). This threshold reflects the unique and limited extent of potential impacts to public services and utilities from coastal restoration projects.

3.14.3 ENVIRONMENTAL CONSEQUENCES

This section discusses the environmental consequences, or impacts, associated with the proposed project on public services and utilities within the study area. Potential adverse, significant, or beneficial direct and indirect impacts are identified as appropriate.

Because the proposed project would generate minimal temporary increased demand for services or utilities (mostly associated with the electric dredge, if used), this analysis focuses on displacement or disruption of public utility infrastructure and public services. Various public utilities and structures traverse the lagoon and could be affected by implementation of the proposed project. Prior to final project design and engineering, a detailed utilities study would be done in coordination with utility providers to accurately locate utilities for avoidance purposes (PDF-29). The utility study would provide information for use in design and engineering to minimize impacts to utilities and service disruptions and provide for the continued stability and integrity of existing or relocated utilities and infrastructure.

Lagoon Restoration

Alternative 2A

Restoration activities within the lagoon would require the dredging, removal, and backfill of large quantities of material, approximately 1.4 mcy from the lagoon basins and tidal channels. Most utilities in the project area are generally situated in or near road ROWs, in well-defined easements, or deeply buried. For example, the recently installed Solana Beach sewer pipe (-45 feet) traverses the central basin and west basin and is located underneath the proposed sedimentation basin/overdredge pit. As such, activities occurring near this pipeline would not exceed -40 feet to ensure adequate cover is maintained (PDF-31). However, there are areas within the lagoon where restoration activities associated with Alternative 2A may disturb existing utilities. In the central basin, a 69-kV overhead electric transmission line runs parallel to the railroad. One pole along this line is situated in the middle of the proposed new inlet location. There would be no way to avoid this pole under Alternative 2A and it would need to be relocated to construct this alternative. Access to the poles north of the inlet along this line would also be hindered. In addition, restoration activities in the east basin also have the potential to disturb one power pole located along the L-shaped transmission line in the northeastern portion of the east basin. This pole is currently located in dense vegetation that would be disturbed as part of the restoration plan. It may be possible to avoid this pole as part of the project's final design, or this pole may need to be relocated. The process for relocating and/or avoiding utilities infrastructure would occur with full coordination and cooperation with SDG&E to minimize service disruption (PDF-29 and PDF-30) and meet siting requirements. The formal utilities investigation would be conducted as part of the next phase of the project, and infrastructure within the lagoon would be fully integrated into the final design and ensure ongoing structural integrity of the infrastructure. Potential utility relocation is expected to be within the identified disturbance area of the project with the possible exception of the SDG&E utility pole as described above. If the subsequent utility study indicates the SDG&E pole would need to be relocated outside of the disturbance footprint, the pole relocation would be designed to avoid significant environmental impacts at

that time and in accordance with applicable SDG&E siting policies. The proposed temporary flooding to facilitate construction activities would not interfere with or impact public utilities or infrastructure as no aboveground infrastructure would be within flooding limits and those flooding limits are below historic flooding levels.

Under Alternative 2A, changes would also be necessary to Coast Highway 101 and a bridge would be constructed over the new inlet. Activities associated with bridge construction would be typical of general construction projects. Alterations to public utility infrastructure associated with the Coast Highway 101 bridge construction would be avoided to the greatest extent possible; if necessary, utility replacement would generally be an in-kind replacement or reinstallation. Construction activities could require a nominal amount of water or wastewater disposal, but not of the magnitude that would affect the service providers' ability to supply adequate service or exceed the capacity of existing facilities, especially given the temporary nature of the demand. Construction debris would be generated during Coast Highway 101 roadway removal and bridge construction. This material would be recycled/reused as appropriate or require disposal. The construction contractor would work with local landfill facilities to locate the most appropriate location for materials disposal. The closest landfill to the project site is the West Miramar landfill located in the City of San Diego, which has adequate capacity until the year 2022 (City of San Diego 2013). Additionally, some vegetation spoils and CDFW dike material would likely need to be hauled off-site for disposal at a local landfill. This volume of material would not be of the magnitude to substantially affect landfill capacity and would be coordinated by the contractor. Other than the construction of the new bridge for Alternative 2A, minor adjustments in existing service infrastructure in the dredging areas are incorporated as part of the project with project design features required to minimize and avoid utility disruption (PDFs-23 through 25). For these reasons, **implementation of the SELRP would not require the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design and no substantial adverse direct or indirect effects would result. Impacts would be less than significant (Criterion A).**

If electrical dredging is used, facilities for electrical power would be provided in the form of a small temporary on-site electrical power substation. If necessary, the temporary electrical power site would be located north of the proposed nesting area and next to staging area #5 (see Figure 2-15). The electrical power substation would connect into existing poles and transmission lines adjacent to railroad tracks and would not require permanent new transmission infrastructure. The power substation would contain outlets for electrical dredge equipment hook-up. A temporary pole may be necessary between the existing transmission lines to feed the power site. Electrical substation equipment would be contained within an enclosed metal structure, approximately 10 feet by 10 feet wide and 8 feet high. The small enclosure could be painted or fenced. The electrical equipment and enclosure would be removed at completion of construction. The

impacts from construction of the enclosure would be minor, but have been analyzed in other portions of this document as appropriate (such as Section 3.9 Visual Resources).

The power demand from use of electrical dredge equipment from local electrical sources would not be sufficient to impact the provision of electrical service in the area. The demand would occur during dredging activities (periodically between fall 2015 and summer 2016) and would not require new or additional electrical delivery infrastructure beyond that proposed as part of the project. Long-term maintenance and adaptive management would also include maintenance dredging of the inlet, subtidal/sedimentation basin, and channels. The nature of these construction activities would not require substantial use of public utilities, such as natural gas, sewer, water, etc. Restoration activities would not result in the development of the types of facilities that would require the use of, connection to, or increased demand on public utilities creating the need for new systems, supply, or infrastructure that could result in environmental effects. There would be no need for substantial alterations to infrastructure, service would not be required from a facility that has insufficient capacity, nor would the project cause an exceedance of available capacity. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Alternative 1B

As with Alternative 2A, restoration activities within the lagoon for Alternative 1B would require the dredging, removal, and backfill of large quantities of material, approximately 1.2 mcy from the lagoon basins and tidal channels. The nature of these construction activities would not require substantial use of public utilities and would not result in the development of the types of facilities that could result in the need for new systems, supply, or infrastructure. The electrical power substation, as described in Alternative 2A, would also be necessary for Alternative 1B, and would be removed after electrical dredging operations were complete. Additionally, because the location of utility infrastructure in the project study area would be fully determined through a utilities study prior to final design and engineering, the dredging and materials removal processes would be designed and completed to avoid or relocate existing utilities as needed. No modification of utilities in or adjacent to Coast Highway 101 would be needed because a new bridge/inlet would not be constructed. For these reasons, Alternative 1B would not result in the temporary or permanent need for new utility systems, substantial alterations to public service systems that could result in environmental effects, or exceedance of available capacity. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Small amounts of construction debris could be generated during some lagoon restoration activities, such as vegetation spoils and material from the CDFW dike. Similar to Alternative 2A,

the construction contractor would work with County landfill facilities to identify the most appropriate location for materials disposal. Thus, Alternative 1B would not result in service requirements from a facility that has insufficient capacity or cause a temporary or permanent exceedance of available capacity. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Alternative 1A

Restoration activities within the lagoon for Alternative 1A would require the dredging and removal of material, approximately 160,000 cy from the lagoon basins and tidal channels. Similar to Alternative 2A, the nature of these construction activities would not require substantial use of public utilities and would not result in the development of the types of facilities that could result in the need for new systems, supply, or infrastructure. The electrical power site, as described in Alternative 2A, would also be necessary for Alternative 1A and would be removed after electrical dredging operations were completed. Additionally, because the location of utility infrastructure in the project study area would be fully determined through a utilities study prior to final design and engineering, the dredging and materials removal processes would be designed and completed to avoid existing utilities and would involve coordination with local utility companies. For these reasons, Alternative 1A would not result in the temporary or permanent need for new utility systems or substantial alterations to public service systems that could result in environmental effects. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Small amounts of construction debris could be generated during some activities, such as vegetation spoils and material from the CDFW dike. The construction contractor would work with landfill operators to identify the most appropriate location for materials disposal.

No Project/No Federal Action Alternative

No dredging or excavation would occur under the No Project/No Federal Action Alternative. As stated in Chapter 2, it can be assumed that there would be a continuation of the current mechanical excavation, which occurs when funding allows, maintaining an open lagoon inlet. The No Project/No Federal Action Alternative involves no new development that could result in the need for increased or altered public utility systems. No construction debris would be generated. Thus, there would be no temporary or permanent impacts to utilities or public services or need for new systems, substantial alterations to public service systems that could result in environmental effects, or exceedance of available capacity. **No substantial adverse impacts would result and impacts would be less than significant (Criterion A).**

Materials Disposal/Reuse

As noted in Section 3.14.1, Affected Environment, the materials disposal/reuse sites are located offshore, nearshore, or onshore where the public services/utilities of concern are the buried ocean outfall (near SO-6) and lifeguard towers/public stairs/drains at various onshore sites. If placement in the nearshore off Cardiff occurs, the project would place more cover on the outfall. This placement would not affect the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design, and it would be a benefit. Therefore, this issue is not discussed further. Thus, the focus of this analysis is the potential impact to existing facilities at various onshore sites, which applies to Alternative 2A and Alternative 1B; Alternative 1A is not discussed further.

The onshore beach placement of material, as proposed under Alternative 2A and Alternative 1B, would be similar to sand placement and beach building strategies utilized for the 2012 RBSP. Thus, much of the information and analysis presented in the 2012 RBSP EIR/EA (SANDAG 2011) are incorporated into the discussion and analysis of onshore beach materials placement for the proposed project.

Alternative 2A

Materials placement on the surface of proposed onshore beach locations would be completed via a pipeline from a barge or directly from the lagoon. Where lifeguard towers or access stairways are located, the sand placement would not impede the ability to use or access these facilities. As shown most recently by the 2012 RBSP, sand cover generally provides additional temporary stabilization and protection for structures from storm surges or erosion. Sight lines from the viewing platforms of the lifeguard towers would be maintained, and there would be no interference with views for the lifeguards (PDF-65). Drainage sand placement around storm drain outlets would be placed to allow continuation of proper drainage (PDF-54).

With the above project design features, the transport and placement of material to onshore locations would not result in the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design. Thus, **public service and utilities impact would be less than significant and would not result in substantial direct or indirect adverse effects (Criterion A).**

Alternative 1B

As described for Alternative 2A, materials placement on proposed onshore beach locations would be completed via a pipeline and would occur on the surface of the sites. Where lifeguard

towers or access stairways are located, the sand placement would not impede the ability to use or access these facilities and would typically provide additional temporary stabilization and protection with no interference to lifeguard line-of-sight views. Drainage sand placement around storm drain outlets would be designed to allow proper drainage. **Alternative 1B would not cause substantial direct or indirect adverse effects and a less than significant impact to public services and utilities would result (Criterion A).**

No Project/No Federal Action Alternative

No materials disposal or reuse would occur; thus, onshore placement sites would not have the temporary benefit of additional temporary stabilization and protection for the structures from storm surges or erosion. **No substantial adverse impacts would result and impacts would be less than significant (Criterion A).**

3.14.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

No significant or substantial adverse impacts to public utilities or structures are anticipated due to lagoon restoration or materials disposal/reuse as substantial use of public utilities or services would not be required and infrastructure would be relocated or avoided. Project design features incorporating a detailed utilities study and coordination with existing utility providers avoid and/or minimize impacts to utilities. Additional features incorporated into the project would minimize impacts to services by maintaining sight lines from lifeguard towers and appropriate drainage at storm drain outlets during materials placement. No mitigation measures are required.

3.14.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA: No significant impacts to public utilities or structures were identified and mitigation measures are not required. Impacts would be less than significant.

NEPA: No substantial direct or indirect adverse impacts to public utilities or structures were identified.

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3.15 HAZARDOUS MATERIALS AND PUBLIC SAFETY

This section addresses hazardous materials and public safety impacts associated with implementation of the SELRP. Flooding and flood hazards are discussed in Section 3.2 Hydrology. Sediment and chemical composition of dredged material are discussed in Section 3.4 Water and Aquatic Sediment Quality; however, this section does discuss these issues in terms of the potential exposure of contaminants to people and the environment. The baseline conditions described in this section are derived from the following technical studies: SAP (M&N 2013, Appendix A) and the Geotechnical Data Report (Appendix M). Specific vector-related information is provided by the Clarification Narrative for Vector Habitat Remediation Program (SELC 2012).

3.15.1 AFFECTED ENVIRONMENT

San Elijo Lagoon Study Area

Hazardous Materials and Public Safety

The San Elijo Lagoon study area is not listed as a hazardous materials site on State of California Hazardous Waste and Substances lists compiled pursuant to Government Code Section 65962.5, and there are no known sites located in the immediate vicinity of the project area (DTSC 2013). However, the lagoon is at the terminus of the Escondido Creek watershed, which encompasses approximately 84 square miles and largely consists of a mixture of developed uses, agriculture, rural housing, open space, and vacant land (SELC 2005). Runoff from the watershed into the lagoon can contain contaminants that can settle into sediments as well, particularly those associated with agricultural and household use, including fertilizers and cleaning agents.

In addition, San Elijo Lagoon has historically been subjected to a number of different activities that could have resulted in contaminated soils within the lagoon, including the discharge of treated sewage into the lagoon's former settling ponds located in the western portion of the central basin, a practice that occurred from 1940 to 1973 (SELC 2013). Currently, treated sewage passes through the lagoon via an underground pipeline maintained by the San Elijo Joint Powers Authority (refer to Section 3.14 Public Services and Utilities for a complete discussion related to utilities within the lagoon).

Hazardous materials used on-site or introduced to the site from other locations can lead to contaminated sediments within the lagoon, which may be a concern as soil disturbance and export are proposed. The SAP (Appendix A) prepared for the project characterized all proposed dredge sediments within the lagoon. However, the report emphasized chemical and physical

results from the overdredge pit, as proposed in Alternative 2A and Alternative 1B, as these materials represent the beneficial reuse component of the project. Chemical analysis of materials in the overdredge pit area found the upper layer to contain some detectable levels of DDD, DDE, and DDT. The northern portion of the overdredge pit was also found to contain some detectable levels of polychlorinated biphenyls (PCBs). Re-sampling of this area found no detectable levels of PCBs; thus, the initially reported levels were determined to be a result of lab error. As detailed in the SAP (Appendix A), based on initial and follow-up correspondence with EPA and the Corps (Webb 2012), these results were not at levels high enough to trigger a concern for the on-site placement of dredged wetland sediments within the overdredge pit or beneficial reuse of sandy sediment extracted from the overdredge pit. To date, the proposed disposal/reuse areas have not been approved by the Corps or EPA; however, a SAP was prepared for the SELRP (Appendix A). Both the Corps and EPA determined that the testing in the SAP is consistent with the ITM testing procedures, which address lagoon-dredged material-placement options such as nearshore and onshore placement, direct lagoon placement, or offshore stockpiling at borrow sites within the 3-mile limit from the shore. Additional Tier 3 testing would confirm the material is suitable and is in compliance with the U.S. Ocean Dumping Regulations prior to EPA and Corps approval of any offshore disposal.

San Elijo Lagoon is an actively used recreational amenity for the public in San Diego's north county, as described in Section 3.1 Land Use/Recreation. Public use is concentrated on the Reserve's hiking trails, near the Nature Center, and west of the Reserve on Cardiff State Beach. The lagoon's trail system is surrounded by private lands, and public access to the lagoon is limited to daylight hours. No direct trail access is available to and from the lagoon to the beach. The beach area north and south of the inlet attracts sunbathers, swimmers, surfers, and other beach enthusiasts.

Vectors

The term "vector" is used to denote a carrier of disease organisms. The vector may be purely mechanical (houseflies spreading enteric organisms), or biological, wherein the disease organism multiplies or undergoes change within the vector (the development of encephalitic viruses in mosquitoes). San Elijo Lagoon has long been a mosquito breeding site. As tidal circulation within the lagoon became more restricted over the past several decades, the east basin area became dominated by freshwater cattails resulting in breeding habitat for mosquitoes.

The lagoon has multiple species of mosquitoes, including *Culex tarsalis*, which is a known vector for encephalitis and West Nile Virus. This mosquito is predominant in the summer months and thrives in freshwater and brackish water seasonal marsh areas. Other species include black salt marsh mosquito (*Aedes taeniorhynchus*) and tule mosquito (*Culex erythrorhax*).

Both the banded foul water mosquito (*Culex stigmatosoma*) and southern California malaria mosquito (*Anopheles hermsi*) have also been documented in San Elijo Lagoon (SELC 2012).

There are a number of receptors sensitive to vector-borne diseases in the vicinity of the lagoon, such as people at beach facilities; people recreating at the lagoon; people at schools, child care centers, and residences surrounding water body. The Nature Center within the Reserve hosted over 18,800 visitors in 2011 and the SELC Education Program provided outdoor programs to students and teachers from various parts of San Diego County over that same period (SELC 2012). Without comprehensive steps to limit their exposure to vector-borne disease, the over 20,000 beneficiaries of these important recreational and education programs, including many residing outside San Diego County, would be at risk.

The conditions that tend to favor mosquitoes are stagnant, fresh or brackish water with minimal circulation, narrow channels or a limited circulation system, and dense vegetation. Key management strategies to control vector populations in water bodies focus on breaking the larval life cycle before they mature and become adult mosquitoes. Strategies focus on increasing water circulation and wave action, varying water levels, decreasing vegetation such as cattails, decreasing nutrients and reducing water temperatures, and providing improved access for natural predators of larval and adult mosquitoes (aquatic and airborne) to potential breeding areas. Aerial larvicide treatments can also become more effective if channels are extended through dense vegetation that may otherwise prevent the larvicide from reaching the water surface. Common natural predators of aquatic mosquito larvae include *Gambusia* (“mosquito fish”), native killifish and stickleback, other small native and nonnative fish species, and the aquatic nymph stages of dragonflies and damselflies (*Odonata*). Predators of adult mosquitoes include frogs, bats, swallows, purple martins, and many other insectivorous bird species.

The east basin of the lagoon is the area of primary concern for mosquitoes. This basin is characterized by static water levels for long periods of time (i.e., no tidal flushing), promoting mosquito egg oviposition and larval and pupal survival and development. As a result, substantial adult mosquito populations may be generated every 7 to 10 days. Accumulation of warm anaerobic, organically rich waters attract certain standing-water mosquitoes, such as *Culex* spp. In contrast, flowing water maintains higher oxygen levels, which contributes to reducing toxic metabolites. Both of these factors enhance the survival of aquatic predators of mosquito larvae (SELC 2012).

Prior to residential developments along the southern border of the Reserve, County of San Diego personnel conducted controlled burns in the east basin to eliminate cattails and other emergent vegetation that might provide refuge to mosquito populations. Newspaper articles as early as 1987 described the need to drain stagnant water from the lagoon to reduce mosquito breeding

habitat. In 2003, San Diego County Vector Control Program (SDCVCP) first applied a biological-based granular mosquito larvicide by helicopter in the east basin of San Elijo Lagoon. The SDCVCP has been regularly applying aerial larvicide at San Elijo Lagoon since 2004 (SELC 2012) as well as conducting site specific treatments at “flare-up” areas with high production of adult mosquitoes. The product used currently is a combination of *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bs) fused to a corn cob granule. It is considered harmless to humans, fish, and other wildlife.

Wildland Fire Hazards

The California Department of Forestry and Fire Protection (CAL FIRE) has identified the southern and eastern portions within and immediately surrounding the project study area as very high fire hazard severity zones (CAL FIRE 2009). Specifically, CAL FIRE mapping identifies the southern side of the Reserve bordering Solana Beach’s northern city limits and the eastern area toward the community of Rancho Santa Fe in the unincorporated area of San Diego County. The vegetation in this area of the lagoon is dense and consists of woody, coastal sage scrub, maritime chaparral, south slope chaparral, and scrub/oak/chaparral mix with shrub sizes ranging from 5 to 15 feet in height (County DPR 2009). Wildland fire safety concerns have been raised due to the presence of native and exotic vegetation in the project area and within proximity to residences. Public safety issues and concerns were raised again after the 2007 Witch Creek fire, which began in Ramona and extended south and east into the community of Rancho Santa Fe.

County DPR, SELC, and the City of Solana Beach Fire Department developed the *San Elijo Lagoon Ecological Reserve Vegetation Management Plan* to address risks associated with fire to lives and property in the Solana Beach neighborhoods adjacent to the project area and to protect the public’s interest in the Reserve (County DPR 2009). The Vegetation Management Plan provides a comprehensive plan for locations where wildland interface exists in the Reserve and guides the removal of exotic vegetation and thinning of native vegetation in select areas to help reduce risks. The Vegetation Management Plan sets methods for vegetation thinning activities and also discusses erosion control, as well as the methods for removal of invasive exotic plant species.

Materials Disposal/Reuse Study Area

The materials disposal/reuse project component would place suitable dredged materials from the lagoon within the coastal environment either offshore, nearshore, or onshore the beach. These areas, by nature, are not susceptible to hazards related to vectors or wildland fires. As noted, chemical analysis of upper level material identifies some low levels of DDD, DDE, and DDT, but concentrations are not high enough to trigger a public health concern and there would be no

risks introducing hazardous materials into the environment (Webb 2012). However, materials from the uppermost layers of the lagoon that contain these low levels of contaminants are generally not suitable for reuse due to their relatively fine grain size. For this reason, these materials would be placed in the overdredge pit in the central basin. (Alternative 2A and Alternative 1B) or at LA-5 (Alternative 1A). Other dredged material appears to be chemically compatible for the beneficial reuse options being considered (i.e., onshore, nearshore, or offshore staging) (M&N 2013). Therefore, this discussion focuses on recreational safety and vessel safety.

Recreational Safety

A primary concern specifically associated with placement of material on a beach or in the ocean is ensuring public safety during construction. Recreational safety is provided by lifeguard services. The California Department of Parks and Recreation provides lifeguards at the state beaches, and the cities of Encinitas and Solana Beach provide lifeguards at beaches within their jurisdiction. Bluff erosion remains a public safety concern, especially along the Encinitas and Solana Beach shoreline areas. Several fatalities and injuries due to bluff collapse have occurred within and adjacent to the Encinitas and Solana Beach materials placement sites (Corps 2012).

Water pollution stemming from storm drain outlets and from the outlets of coastal lagoons has resulted in posting at and/or occasional closing of beaches to protect public recreational safety. Bacteria indicators are monitored at storm drain outlets and adjacent surfzone and in the surfzone offshore coastal lagoons. With few exceptions, bacteria concentrations measured in the surfzone up- and down-current of the storm drain outlets have been within state standards for water-contact recreation.

Scarps (or escarpments) develop naturally along beach profiles and vary in height due to substantial changes in the beach profile (i.e., drastic drop in elevation). Scarp height is a function of the breaking wave height and the elevation of the existing beach berm. Large scarps may result in safety hazards due to substantial changes in the beach profile (i.e., drastic drop in elevation).

Vessel Safety

During materials placement, vessel safety is a concern as operations may include a variety of ocean-based barges, monobouys, and discharge pipelines traversing waters used by ocean-going vessels. Commercial boats, fishing boats, and recreational vessels currently traverse the overall project area along the San Diego region's coast. Most vessels operate out of Oceanside Harbor, Mission Bay, and San Diego Bay.

3.15.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to hazardous materials would occur if implementation of the proposed project would:

- A. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- B. Substantially increase public safety hazards for people surfing, swimming, walking, or otherwise recreating in and around the lagoon and the beach areas;
- C. Create a substantial public health hazard from management or disposal of dredged/excavated material;
- D. Substantially increase human exposure to vectors, such as mosquitoes, that are capable of transmitting significant public health diseases or creating nuisances (threshold considered for lagoon restoration only); or
- E. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (threshold considered for lagoon restoration only).

The hazardous materials and public safety CEQA thresholds were derived from a combination of sources, including Appendix G of the CEQA Guidelines and County guidelines for determining significance for vectors, wildland fire and fire protection, and hazardous materials and existing contamination. Thresholds such as B and C were specifically developed in consideration of specialized or unique conditions requiring attention due to the nature of the project or the location within the lagoon and nearby beach areas.

3.15.3 ENVIRONMENTAL CONSEQUENCES

Lagoon Restoration

Alternative 2A

Hazardous Materials and Public Safety

No known hazardous materials sites are located within the lagoon or the lands immediately adjacent the project study area. Restoration activities would include dredging of materials within

the lagoon. Sediment quality investigations have been conducted on materials to be dredged, and it was determined that some areas within the uppermost layer contain some harmful chemicals (i.e., DDD, DDE, and DDT). As detailed in the SAP (Appendix A), based on initial and follow-up correspondence with EPA (Webb 2012) and the Corps, the levels of contaminants found in the marsh sediments (silts and clays) material were low enough not to trigger a concern for the on-site placement proposed (bottom of the overdredge pit and capped with remaining wetland soils dredged during construction). Chemistry of the material planned for beneficial reuse is appropriate and not considered a health concern issue. Consideration of health concerns were based on comparison of the detected contaminant levels with California Human Health Screening Levels (CHHSLs) as developed by the California EPA and Office of Environmental Health Hazard Assessment and detailed in the SAP (Appendix A) (M&N 2013). CHHSLs are concentration levels of chemicals that California EPA has determined to be below thresholds of concern for risks to human health (California EPA 2005). However, the material from these uppermost layers of the lagoon, which contain low levels of contaminants, is generally not suitable for reuse due to its relatively fine grain size. For this reason, these materials would be placed in the overdredge pit in the central basin. Following placement of this material, the overdredge pit would be capped by sand material dredged from the proposed inlet location, which would encapsulate the material and prevent it from being introduced into the water column or released into the environment (M&N 2013). Sediment quality investigation results are discussed in detail in Section 3.4 Water and Aquatic Sediment Quality. Storage, handling, transport, emissions, and disposal of hazardous materials would occur in full compliance with local, state, and federal laws and regulations, such as Health and Safety Code, Sections 25500–25520 (PDF-11). **Therefore, there is a less than significant impact related to hazardous materials due to location or routine transport, use, or disposal of dredged/excavated materials (Criteria A and C) and no substantial adverse effect would result.**

Construction equipment would require a number of petroleum products such as fuel, hydraulic fluids, and lubricants for effective operation. Fuel replenishment would be required daily for most of the heavy equipment. Fueling and/or maintenance activities would occur at the staging areas away from these accessible areas (PDF-33), and the contractor would be required to prepare a Spill Prevention, Control, and Countermeasure (SPCC) plan for hazardous spill containment (PDF-3). Spills would be cleaned up in accordance with permit conditions.

During construction of Alternative 2A, heavy equipment and vehicles would be present in the project study area for lagoon restoration activities, including dredging within the lagoon and construction of the new inlet and associated CBFs. Heavy equipment would also be used to construct a new bridge along Coast Highway 101 to span the new inlet location. During off working hours, heavy equipment and vehicles in areas that could be accessed by the public would be secured in a general contractor's staging area and would not pose a safety hazard

(PDF-34). Construction areas would be staked and no construction zones defined (PDF-4). As necessary, access to portions of lagoon trails and beaches would be temporarily restricted to maintain public safety (PDF-5). Ongoing maintenance activities would be subject to these same safety precautions in an effort to reduce public safety hazards associated with heavy equipment operations to people surfing, swimming, walking, or otherwise recreating in and around the lagoon. Additionally, PDF-1 would require implementation of a public information program to assist nearby residents in understanding the purpose of the project and to disseminate pertinent project information. Incorporation of these safety project design features would protect publicly accessible areas within the lagoon (i.e., trails and the existing inlet) to ensure public safety is maintained.

The temporary controlled flooding that would be necessary during dredging operations to provide adequate water levels to support the barges would not create a hazard or public safety risk. Some trail closures would be required during flooding to ensure public safety as detailed in Section 3.1 Land Use/Recreation. The temporarily flooded areas would be within current and historical areas of lagoon inundation. **Therefore, there would be a less than significant impact to public safety associated with lagoon flooding and dredging and bridge building (Criterion B) and no substantial adverse effects would result.**

Once Alternative 2A is constructed, the new inlet and associated CBFs would be a permanent project feature in the onshore and nearshore beach environment along Cardiff State Beach. The new inlet would be deeper and wider than the existing inlet. While large-scale changes to the patterns of currents are not anticipated with implementation of the new inlet, ebbing tidal currents would extend from the wetlands to the nearshore ocean in a gradually dissipating and spreading plume. This could create a hazard for beachgoers and swimmers. CBFs would extend to the msl line on the beach (and to the MLLW contour under the sand beach) and would be shoreward of the surf zone where wave breaking occurs under most conditions. Surfers and beachgoers are expected to stay away from the CBFs and the new inlet to avoid potential injury and would likely cross the channel farther seaward along the MLLW line where the inlet would become relatively shallow and wide. By themselves, the new inlet and CBFs do not pose a safety hazard. However, persons who stray too close to these areas may place themselves in situations that may result in injury should they be thrown against the CBFs, or swept into the inlet or a rip current. Limited lifeguard services are provided by the California Department of Parks and Recreation at Cardiff State Beach. The presence of lifeguards closer to the new inlet and CBFs would help reduce public safety hazards. Warning signs would also enhance public awareness to avoid potential safety hazards. Public unawareness is the greatest factor contributing to significant public safety hazards near the new tidal inlet and CBFs under Alternative 2A. **This would result in significant and substantial adverse impact to public safety associated with CBF installation (Criterion B).**

Vectors

Vector issues are an existing concern at the lagoon and are addressed routinely by SDCVCP, primarily via aerial application of granular larvicide. The potential for project impacts must be evaluated during the construction period, given phased water impoundment, and post-construction given modified habitats, channels and water areas.

During construction, multiple factors would serve to change the vector breeding conditions that currently exist throughout the lagoon. Temporary inundation of areas in the central and west basin during construction for Alternative 2A would raise the water level in impounded areas to an elevation of +5 or +6 feet NGVD (Figures 2-16 and 2-17). This elevation would be higher than existing water levels and, although impounded, water within the diked areas is not expected to result in increased vector concerns. Mosquito larvae are usually concentrated in the water surface tension zone (meniscus) where water contacts leaves and stems; raising the water level breaks up this larval harborage and prevents adult production. Water used to inundate flooded areas would be captured during high tide inflow from the ocean, increasing the overall salinity within the impounded areas. As flooding is initiated, vegetation extending out of the water would be cleared from the lagoon, removing cattails and other sheltering areas for mosquito larva. The flood water levels above vegetation, as well as areas that would be cleared, would substantially reduce the amount of aquatic vegetation available for larva protection and would allow predators, such as aquatic invertebrates, fish, birds, and dragon flies to access and feed on the larva more efficiently.

Once flooded, large portions of the lagoon would be an expanse of open water more subject to wind wave action. While in this coastal area there is a prevailing wind, it is currently blocked by dense vegetation and a lack of contiguous water. The wind-activated, moving waters would be less conducive to successful mosquito breeding. The engines and propellers of dredging equipment and support vessels moving from place to place in the impoundment areas would provide manual circulation below the water surface. The hydraulic cutterhead suction dredge would not generate substantial turbidity and would minimize nutrients from suspended sediment in the water column. This would reduce the ability of the larva to feed during the dredging period and maximize the ability of sight-feeding predators to find the larva. Overall, the lagoon would be far less conducive to mosquitoes as vegetation would be removed, water salinity increased, and wind action and channel design would increase circulation.

Outside of diked and deeply inundated areas, the lagoon would remain open to tidal action and freshwater inflow as under current conditions. Conditions in the east basin would remain generally the same during Phases 1 and 2 of construction (Figure 2-16). The existing CDFG dike would be modified to control water flowing west to east and to maintain elevation 6 feet NGVD

in that central basin. In Phase 3, the dike would be located at I-5 but still functioning to keep the central basin at 6 feet NGVD. Water would be conveyed from east to west over the dike so that elevations on the east side would remain 5 feet NGVD or lower (current conditions). Thus, freshwater flows heading to the ocean would not be impounded in the east basin and water would not increase retention time in the cattails, or create new sources of mosquito breeding. By Phase 4, the dike would be removed and tidal circulation would extend east of I-5. Control measures in the east basin would continue as currently performed.

During construction there would be heavy equipment, construction vehicles, and other tools/storage facilities along the edges of the lagoon. These locations are focused on staging areas so they do not rim the entire lagoon. There is some potential for rainwater or other sources to become impounded in small containers or wheel ruts. Given the rapid mosquito life cycle, an impoundment of 7 to 10 days can allow for successful breeding. As described in Table 2-25, a biological monitor would be on-site during construction. That person would perform a variety of tasks to ensure construction remains within the ROW and complies with all design features, standard regulations, permit conditions, construction specifications, and mitigation measure. As noted in PDF-14, one responsibility will be confirmation that the contractor is satisfying construction specifications dictating no ponded water. They would also be empowered to release small containers of water to eliminate breeding conditions. A construction specification will also be applied requiring Vector Control staff to have access throughout construction for their routine monitoring and treatment activities.

After implementation, Alternative 2A would result in improved circulation throughout the lagoon, including the east basin. Channels would be widened and extended into aquatic vegetation in the central and east basins, and much of the freshwater marsh currently in the east basin would be removed. The primary change in habitat distributions under Alternative 2A would be an increase in open water areas/tidal channels (74 acres proposed) and mudflat habitat (102 acres proposed) within the lagoon compared to existing conditions (40 and 63 acres, respectively). Freshwater marsh in the lagoon, primarily monocultures of dense cattail, would be reduced by 36 acres and other marsh habitats (low-, mid-, and high-) would be reduced by 20 acres. Open water areas and tidal channels would be increased in all three lagoon basins compared to existing conditions. It is not possible to totally eliminate vectors in the lagoon because of the overall size and habitat diversity, but the restoration provided by Alternative 2A would decrease habitats good for mosquito propagation and harborage (dense expanses of freshwater and saltwater marsh) and increase unfavorable habitats for mosquitoes (open water, channels within marsh areas, tidal mudflats, regularly inundated/tidally drained areas).

The subtidal basin would be created and the main channel would be enlarged and straightened, increasing the ability of waves and ripples to be created on the water surface. In addition,

enhanced tidal action under Alternative 2A would lead to a much larger area inundated at high tide, and a smaller area inundated at low tide. More open water and the dynamic hydrologic cycle of tides would interrupt the mosquito reproduction process, and would lead to substantially increased mortality of eggs, larvae, and pupae. Eggs laid on water during one point of the tide may be left totally high and dry during the subsequent low tide, or delivered directly to the ocean by tidal currents (SELC 2012). Increased tidal action under Alternative 2A would also result in other benefits for mosquito abatement, including increased salinity, which reduces the ability of these vectors to reproduce; quick draw-down, which prevents establishment of stagnant ponds on the lagoon edges; and habitat conversion with less emergent plant growth in the east basin resulting in better circulation of water, improved access for SDCVCP staff, and improved effectiveness of vector control measures.

The higher volume of cooler ocean water entering more expansive areas of the lagoon would create a poor temperature-based environment for larvae survival. Existing nutrient-rich soils currently cause the lagoon system to become eutrophic and create good breeding habitat/food for larva. Large volumes of this soil would be removed as part of Alternative 2A through shallow grading/dredging. Alternative 2A should significantly reduce the need for periodic aerial larvicide treatments during the summer months, thereby substantially reducing expenditures by SDCVCP (SELC 2012).

Implementation of Alternative 2A would result in a less-conducive vector breeding condition and reduce the public health and safety risk associated with mosquito-borne diseases. Substantial increases in human exposure to vectors are not anticipated either during construction or after implementation of Alternative 2A. For this reason, implementation of Alternative 2A would not substantially increase human exposure to vectors, such as mosquitoes, that are capable of transmitting significant public health diseases or creating nuisances and no significant or substantial adverse impacts would occur, rather **beneficial project impacts would occur (Criteria B and D)**.

Wildland Fire Hazards

As previously discussed, the southern and eastern portions of the project study area are located adjacent to lands that have the potential to support wildland fires. Alternative 2A would result in vegetation clearing and grubbing activities within the lagoon boundaries; however, neither construction nor maintenance activities would occur within the wildland interface areas. Lagoon restoration and maintenance activities would not conflict with implementation of the Vegetation Management Plan. In addition, restoration activities would not introduce new or permanent structures within the lagoon area that would create new fire hazards. While fire hazard risks associated with construction equipment are not anticipated, a variety of project design features

would be implemented by the contractor (Section 2.10). Specifically, construction equipment used in restoration and maintenance activities would have fire suppression equipment on board or at the worksite (PDF-35), heavy equipment operators would be trained in appropriate responses to accidental fires (PDF-36), and emergency communication equipment would also be available to site personnel. **Impacts associated with wildland fires would not be substantially adverse and would be less than significant (Criterion E).**

Alternative 1B

Alternative 1B would retain the existing inlet location and would not require construction of new structures on the beach or within the lagoon inlet area (i.e., CBFs). During construction, implementation of the project design features, such as an SPCC plan for hazardous spill containment (PDF-3), equipment fueling/maintenance in designated locations away from accessible areas (PDF-33), securing equipment during off-hours (PDF-34), defining and staking construction areas (PDF-4), temporarily restricting access to portions of lagoon trails and beaches (PDF-5), and implementation of a public information program (PDF-1) would help to reduce public safety hazards to people surfing, swimming, walking, or otherwise recreating in and around the lagoon mouth to less than significant. Ongoing maintenance activities would be subject to these same safety precautions. The discussion of hazardous material safety and wildland fire hazards and associated regulatory requirements and project design features for Alternative 2A are applicable to Alternative 1B. **Impacts related to hazardous materials, public safety, and wildland fires would be less than significant (Criteria A, B, C, and E) and would not be substantially adverse.**

Similar to Alternative 2A, Alternative 1B would increase tidal influence and salinity in the east basin. Channels would be widened, straightened, and extended into vegetation, allowing for wind-driven wave action and predator access to areas currently providing shelter for larval mosquito populations. Temporary flooding during construction of Alternative 1B would also result in increased wave action, circulation, and salinity, and a decrease in dense visible vegetation. Nonflooded areas would remain open to tidal action and freshwater inflow as under current conditions, or under the designed enhanced channel configuration proposed under Alternative 1B. Habitat distributions under Alternative 1B would be an increase in open water areas/tidal channels (67 acres proposed) and mudflat habitat (71 acres proposed) within the lagoon compared to existing conditions (40 and 63 acres, respectively). Most of the increase in open water/tidal channels and mudflat habitat would occur in the central and east basins. Conditions during and after construction are anticipated to be better for mosquito control than under current conditions. Implementation of Alternative 1B would facilitate the control of vectors at the lagoon and reduce the public health and safety risk associated with vector-borne diseases. Substantial increases in human exposure to vectors are not anticipated during construction or after

implementation of Alternative 1B. **No significant or substantial adverse impacts would occur; rather, beneficial project impacts would occur (Criteria B and D).**

Alternative 1A

Alternative 1A would result in impacts similar to those described for Alternative 1B related to public safety and wildland fires. Alternative 1A would retain the existing inlet location and would not require construction of new structures on the beach or within the lagoon inlet area (i.e., CBFs). During construction, implementation of the project design features, such as an SPCC plan for hazardous spill containment (PDF-3), equipment fueling/maintenance in designated locations away from accessible areas (PDF-33), securing equipment during off-hours (PDF-34), defining and staking construction areas (PDF-4), temporarily restricting access to portions of lagoon trails and beaches (PDF-5), and implementation of a public information program (PDF-1) would help to reduce public safety hazards to people surfing, swimming, walking, or otherwise recreating in and around the lagoon mouth to less than significant. Intermittent maintenance activities would be subject to these same safety precautions. The discussion of hazardous material safety and wildland fire hazards and associated regulatory requirements and project design features for Alternative 2A are applicable to Alternative 1A. **Impacts related to hazardous materials, public safety, and wildland fires would be less than significant (Criteria A, B, C, and E) and would not be substantially adverse.**

Under Alternative 1A, the main feeder channel throughout the site would be enlarged and redirected just west of I-5, the main tidal channel would be extended farther into the east basin, existing constricted channel connections would be cleared and enlarged, and two new channels would be created through the CDFW dike to allow tidal and fluvial connections. The tidal prism of Alternative 1A would be slightly increased compared to existing conditions. Existing habitat areas would essentially remain intact, although some freshwater habitat areas in the east basin are anticipated to convert to more saltwater-based communities due to enhanced tidal influence and the resulting changes in inundation frequencies. Because this alternative would have the least increase to tidal flow and least change to the east basin, the benefits associated with an improved vector controlled environment would not occur, but neither would the vector control environment worsen over the existing conditions. **No significant or substantial adverse impacts related to vectors would occur (Criteria B and D).**

No Project/No Federal Action Alternative

Under the No Project/No Federal Action Alternative, impacts related to public safety and risks associated with wildland fires would remain similar to existing conditions. Impacts would be less than significant for both of these issues. However, the conditions at the lagoon associated with

vectors would continue to be exacerbated without implementation of the proposed project or alternatives. Under the No Project/No Federal Action Alternative, no actions would be taken to improve the tidal circulation within the east basin and conditions would continue to accumulate stagnant waters that attract mosquitos, thereby increasing the chance for exposure of vector-borne disease in the nearby communities. While this issue is currently being addressed by the SDCVCP, no long-term plan is in place, besides the proposed project, to help reduce vector-related issues. Although **no new impacts (Criteria A through E) or substantial adverse effects would be anticipated** under the No Project/No Federal Action Alternative, conditions would remain unchanged.

Materials Disposal/Reuse

The materials disposal/reuse project component would occur within the coastal offshore, nearshore, and onshore beach environment that is not susceptible to hazards related to vectors or wildland fires. Therefore, these issues are not addressed further.

For all project alternatives, it should be noted that dredged materials have been tested and it was determined that some areas within the uppermost layer contain detectible levels of some harmful chemicals (i.e., DDD, DDE, DDT); however, as described earlier, these low levels are not substantial enough to cause a public health concern based on initial correspondence with EPA (Webb 2012). The material appears to be chemically compatible for the beneficial reuse options being considered (i.e., onshore, nearshore, or offshore staging) (M&N 2013). However, the uppermost layers of material would not be suitable for reuse based on the relative fine grain size. Under Alternative 2A and Alternative 1B, this material would be disposed of in an overdredge pit in the central basin. Following placement of this material, the overdredge pit would be capped by sand material dredged from the proposed inlet location, which would encapsulate the material and prevent it from being introduced in the water column or released into the environment (M&N 2013). For Alternative 1A, dredged material would be disposed of in LA-5. Preliminary soil investigations included in the SAP also suggest the material would be suitable for disposal at LA-5; however, a formal determination from EPA and the Corps would be required prior to disposal. Discussions in the SAP regarding offshore disposal at LA-5 occurred for background and to understand its capacity limitations, but formal submittals requesting authorization to place sand would be made upon selection of a final alternative. If disposal at LA-5 were to be part of the selected alternative, then supplemental Tier 3 analysis would be conducted. Should the materials be determined not suitable for disposal at this location, the material would be sequestered on-site in built transition or nesting areas. Sediment quality investigation results are discussed in detail in Section 3.4 Water and Aquatic Sediment Quality.

Contaminated materials are not anticipated to exist within dredge areas according to results of previous testing (M&N 2013); however, the possibility exists that other unforeseen wastes and hazardous materials could be dredged from the lagoon due to contamination from past sewage spills, potentially illegal dumping of hazardous materials, or other sources. **Therefore, under CEQA Alternative 2A, Alternative 1B, and Alternative 1A could create a public health hazard from management or disposal of dredged/excavated material and this would be a potentially significant effect (Criterion C). Because prior testing showed that there was no contamination at levels that would cause a public health hazard in the proposed dredge material, no substantial adverse effects could result per NEPA.**

Alternative 2A

Vessel Safety

Under Alternative 2A, materials could be placed in the offshore environment in SO-5 and/or SO-6 and/or area beaches, using a monobuoy and barges to transfer material to those sites. The primary hazard associated with offshore placement is vessel safety during the transport of materials. The potential for a vessel to collide with the barge or a support vessel would be remote as vessels would be equipped with markings and lights in accordance with established USCG regulations. The location and operational schedule of the barge would be published in the USCG “Local Notice of Mariners” to inform local boaters of the presence and location of the barge (PDF-61). The travel speed would also be slow (approximately 5 knots) during the transport of sand to placement sites. To maintain vessel safety, a 300-foot-radius buffer area would be established around the monobuoy in offshore waters (PDF-62), to allow proper anchoring and pump line operation. To ensure that no vessels would enter this restricted zone, the anchoring area would be included in the “Local Notice to Mariners.” All pipelines used during offshore stockpiling efforts, including both floating and submerged, would be clearly marked as “navigational hazards” (PDF-60). There would be a short-term and localized increase in vessel traffic in the area associated with project construction with a limited distance of travel to set and remove the pipeline. Therefore, Alternative 2A would not create navigation hazards or result in unsafe conditions for vessel traffic. **Public health and safety impacts associated with offshore placement of materials under Alternative 2A would be less than significant and no substantial adverse impacts would occur (Criteria B and C).**

Public/Recreational Safety

None of the potential beach placement sites are included on a list of hazardous material sites. For nearshore and onshore placement sites, portions of the beach directly affected by active materials placement activities may be closed temporarily (PDF-63). Closing the area to the public would

prevent potential unsafe conditions for the public associated with the presence and operation of heavy equipment used to move the sand around on the beach. Adjacent stretches of beach not directly affected by placement activities, such as those areas through which pipeline may extend but where sand is not directly being placed, would remain open to public access and recreational activities (PDF-6). Depending on the beach site and material excavation rates, up to 1,000 feet of beach may be closed per day in a specific location. As sand placement activities shift along the beach, those areas in which sand placement has been completed would be reopened to public use. Prior to opening areas of beach with placed materials, the material would be spread and checked for potential hazards (e.g., foreign objects in the sand) (PDF-67). Horizontal access along the back beach would be maintained at sites with no alternative access (e.g., where a wet beach abuts bluffs), with temporary closures occurring as necessary to complete sand placement to the back edge of the beach (PDF-70). Lifeguard services would remain during construction and mobile lifeguard towers would be temporarily relocated if necessary (PDF-64), and sand would be placed to avoid blocking line-of-sight at permanent lifeguard towers (PDF-65).

Ocean areas directly adjacent to sand transport/placement equipment and activities may also be temporarily closed to ensure public safety. Buffers around temporary monobuoys and ocean placement sites would be maintained to avoid water recreation users and vehicle safety hazards. Additionally, the safety-related project design features described above would provide necessary safety measures in the vicinity of the nearshore and onshore placement sites to ensure public safety is maintained at all times. Fueling and/or maintenance activities would occur at the staging areas away from the beach, and the contractor would be required to prepare an SPCC plan for hazardous spill containment (PDF-3).

Potential safety impacts due to increased scarp heights may occur. As a project design feature, the Marine Safety departments in the cities of Encinitas, Solana Beach, and San Diego would post signs advising the public of the presence of scarps should they develop on the beaches where sand is being placed (PDF-66). These scarps often occur naturally in the absence of beach nourishment and are usually short term and localized and would not be considered a significant effect of the project.

Onshore materials placement at Encinitas and Solana Beach could result in potential public health and safety benefits by increasing beach widths. This could increase the distance between beachgoers and dangerous bluffs, and may, in the short term, reduce the number of bluff failures affecting the public safety on the beaches.

Public health and safety impacts associated with nearshore and onshore placement of materials under Alternative 2A would not be substantially adverse and would be less than significant (Criteria A, B, and C).

Alternative 1B

Materials placement options under Alternative 1B would be very similar to those described for Alternative 2A. Alternative 1B would produce slightly less volume of dredged materials to be placed offshore, in the nearshore at Cardiff, or at onshore beach locations. This would result in similar impacts in the offshore, nearshore, and onshore placement sites, as described for Alternative 2A. **Public health and safety impacts associated with offshore, nearshore, and/or onshore placement of materials under Alternative 1B would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

Alternative 1A

Under Alternative 1A, dredged materials would be disposed of offshore in LA-5 or used on-site in the nesting or transitional areas. The primary hazard associated with offshore placement is vessel safety during the transport of materials and this activity would be performed consistent with the project design features in Section 2.10, including publishing the location and operational schedule in the USCG “Local Notice of Mariners” (PDF-61) and the implementation of a 300-foot-radius buffer area around the barge lane in offshore waters to maintain vessel safety (PDF-62). **Public health and safety impacts associated with placement of materials under Alternative 1A would not be substantially adverse and would be less than significant (Criterion B and C).**

No Project/No Federal Action Alternative

No materials would be placed offshore, nearshore, or onshore under the No Project/No Federal Action Alternative. At some of the onshore placement sites, waves could continue to erode fragile bluffs. This deterioration is occurring under existing conditions. **Impacts from the No Project/No Federal Action Alternative would not be substantially adverse and would be less than significant (Criterion B and C).**

3.15.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Project design features have been incorporated throughout the project to minimize and avoid hazardous material and public safety hazards. Project design features also incorporate measures necessary to meet regulatory requirements and standards related to hazardous material safety. Project design features addressing hazardous materials and public safety include implementation of a SPCC plan for hazardous spill containment, equipment fueling/maintenance in designated locations away from accessible areas, securing equipment during off-hours, defining and staking construction areas, providing fire suppression equipment onboard or at the worksite, and training

heavy equipment operators in appropriate responses to accidental fires. Vessel safety project design features include publishing the location and operational schedule of the barge in the USCG “Local Notice of Mariners”, establishing a 300-foot-radius buffer area around the monobuoy in offshore waters, and marking pipeline used during materials placement on adjacent beaches and offshore stockpiling efforts as “navigational hazards.” Other public safety project design features require temporarily restricting access to portions of lagoon trails and beaches, implementation of a public information program, relocating mobile lifeguard towers, and maintaining line-of-sight from all lifeguard towers. There would be no significant impact associated with vectors so no mitigation measures are warranted. Impacts from construction of a new inlet would be substantially adverse and significant. Significant impacts would also occur to public health hazards from disposal of dredged materials. Mitigation for those impacts is discussed below.

Lagoon Restoration

The following mitigation measures are needed to reduce impacts associated with construction of a new inlet under Alternative 2A:

- HAZ-1 The project applicant shall continue coordination with California Department of Parks and Recreation to relocate the mobile lifeguard tower (State Lifeguard Tower No. 6) closer to the new inlet location.
- HAZ-2 The project applicant shall continue coordination with California Department of Parks and Recreation to install signs at the new inlet to enhance public awareness to avoid potential safety hazards associated with the new inlet location and associated CBFs.

Materials Disposal

The following CEQA mitigation measure is needed to reduce impacts associated with public health hazards from management or disposal of dredged/excavated material under Alternative 2A, Alternative 1B, and Alternative 1A:

- HAZ-3 A sediment management plan shall be developed and implemented to test dredged materials for proper placement in the overdredge pit or for off-site transport and proper disposal and to be in compliance with local, state, and federal regulations. The plan shall specify that if unknown contamination or other buried hazards are encountered during dredging, procedures must be carried out according to applicable regulations. Any material encountered that appears to contain contaminants shall be handled in accordance with local, state, and federal guidelines, and permit conditions.

3.15.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA: Implementation of Mitigation Measures HAZ-1 and HAZ-2 would reduce public safety risks associated with the new inlet and CBFs under Alternative 2A to less than significant.

With implementation of HAZ-3, the potentially significant CEQA impacts would be reduced to a less than significant impact related to upset and accident conditions involving the release of hazardous materials into the environment for Alternative 2A, Alternative 1B, and Alternative 1A.

The No Project/No Federal Action Alternative would result in less than significant impacts related to hazardous materials and public safety for both lagoon restoration and materials placement project components and no mitigation measures are required. The benefits to vector control (less conducive conditions) would not be realized.

NEPA: Implementation of Mitigation Measures HAZ-1 and HAZ-2 would reduce substantial adverse public safety risks associated with the new inlet and CBFs under Alternative 2A.

Implementation of the No Project/No Federal Action Alternative would not result in substantial adverse impacts related to hazardous materials and public safety for both lagoon restoration and materials placement project components. The benefits to vector control (less conducive conditions) would not be realized.

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3.16 GLOBAL CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

A variety of studies have been conducted analyzing global climate change, the effect anthropogenic factors have on climate change, and the potential effects to the region of anticipated future climate change impacts. This section provides the Affected Environment and regulatory context that apply to the key issues that pertain to climate change for this project: greenhouse gas (GHG) emissions and sea level rise/extreme events. The GHG emissions calculations and more detailed regulatory information are provided in Appendix K. Data described in these analyses accurately reflect conditions at the time of NOP publication.

3.16.1 AFFECTED ENVIRONMENT

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place. Climate change refers to the change in long-term average weather conditions and is a global phenomenon (Gutro 2005).

Certain gases in Earth's atmosphere, classified as GHGs, play a critical role in determining Earth's surface temperature. Solar radiation enters Earth's atmosphere from space. A portion of the radiation is absorbed by Earth's surface, and a smaller portion is reflected back toward space as infrared radiation (heat). Infrared radiation is selectively absorbed by GHGs; as a result, infrared radiation released from Earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This is known as the "greenhouse effect" and is responsible for maintaining a habitable climate on Earth. Without the naturally occurring GHGs and the greenhouse effect, Earth would not be able to support life as we know it.

However, anthropogenic emissions of GHGs leading to atmospheric levels in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect. This has resulted in a trend of unnatural warming of Earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (IPCC 2007). There is international scientific consensus that human-caused increases in GHGs have contributed and will continue to contribute to global climate change, although there is uncertainty concerning the magnitude and rate of the change.

ARB has identified six principal GHGs that contribute to the greenhouse effect: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). These six GHGs compose the emissions to be monitored to meet the requirements of AB 32, the Global Warming Solutions Act of 2006. Likewise, EPA's endangerment finding of 2009 covers emissions of the same six GHGs. Water vapor is an

important GHG but its concentration depends on temperature and other meteorological conditions; therefore, it is considered a feedback of climate change rather than a direct cause (IPCC 2007).

Carbon dioxide equivalent (CO₂e) is a measurement used to account for the fact that each type of GHG has a different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. Expressing emissions in CO₂e takes the contributions to the greenhouse effect of all GHG emissions and converts them to the equivalent effect that would occur if CO₂ were being emitted. This measurement, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere and is generally calculated over a 100-year period. The GWP of the six principle GHGs is shown in Table 3.16-1.

Table 3.16-1
Global Warming Potential of Greenhouse Gases

Greenhouse Gas	Symbol	Global Warming Potential (CO ₂ e)
Carbon Dioxide	CO ₂	1
Methane	CH ₄	21
Nitrous Oxide	N ₂ O	310
Hydrofluorocarbons	HFC	14–14,800
Perfluorocarbons	PFC	6,500–12,200
Sulfur Hexafluoride	SF ₆	23,900

Source: IPCC 2007

The amount of CO₂ in the atmosphere in the past 150 years (the time when anthropogenic GHG emissions increased significantly) has risen from approximately 280 parts per million (ppm) to 390 ppm and is increasing at a rate of approximately 2 ppm per year (NOAA 2012). Although efforts at the international, national, state, and local levels are underway to reduce future emissions of GHGs, some level of climate change has already occurred and additional climate change is predicted for the future, although the extent of future change is uncertain. The change in GHG emissions has led to 1.3°F change in average global air temperature from 1900–2000. The Intergovernmental Panel on Climate Change (IPCC) anticipates that additional increases in atmospheric CO₂ could increase by up to 11.5°F by 2100.

Increased levels of GHGs in the atmosphere not only affect global average temperatures, but climate change models predict changes in temperature, precipitation patterns, water availability, sea levels, and extreme events, such as tsunamis. It is anticipated their impact will vary by region, and these altered conditions may have severe impacts on natural and human systems in California (CalEPA 2010). Sea levels have risen by as much as 7 inches along the California coast over the last century. The state has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with

less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year (CNRA 2009). Additional changes related to climate change can be expected by the year 2050 and on to the end of the century:

- California's mean temperature may rise 1.5°F to 5.0°F by 2050 and 3.5°F to 11°F by the end of the century.
- Average annual precipitation may show little change, but more intense wet and dry periods can be expected with more floods and more droughts.
- Flood peaks will become higher and natural spring/summer runoff will become lower.
- Global sea level projections suggest possible sea level rise of approximately 14 inches (36 centimeters) by 2050 and a high value of approximately 55 inches (140 centimeters) by 2100 (CNRA 2009).

Climate models are used to predict changes in temperature, precipitation, and other effects due to climate change. In the past, models have been reliable on a global scale; more recently, confidence in regional models is increasing (IPCC 2007) and can provide a more localized evaluation of climate change impacts by downscaling global models to specific regions. Downscaling (at the 12-kilometer grid level) has been conducted for California and shows southern coastal areas are likely to experience average temperatures of 2.9 to 3.8°F (1.6 to 2.1° Centigrade) warmer and +3 percent to -24 percent annual precipitation by about 2065 (Cayan et al. 2012). California has created an interactive website called Cal-Adapt to help planners assess regional and local impacts of climate change under different scenarios (<http://cal-adapt.org/>).

Sea level rise will not be uniform, nor uniformly affect the state's population, infrastructure, and ecosystems. The population vulnerable to a 100-year flood along the Pacific coast in San Diego County will increase by 210 percent with a 55-inch sea level rise, from 3,000 to 9,300 residents (Heberger et al. 2009).

The Pacific Institute has developed a series of maps demonstrating areas at risk in the current 100-year flood zone and with a 55-inch sea level rise (Figure 3.16-1). The map for San Elijo lagoon is presented below; light blue indicates the current 100-year flood zone and dark blue indicates the flood zone under a sea level rise scenario of 55 inches in 2100.

Extreme events that would be exacerbated due to sea level rise include storm surge and tsunamis. As mapped by the California Emergency Management Agency, California Geological Survey, and University of Southern California, the entire coastline in the San Diego region is considered a tsunami hazard area (Department of Conservation 2009). San Elijo Lagoon is also included

CEQA

ARB and SDAPCD have not established quantitative significance thresholds for evaluating GHG emissions in CEQA analyses. Appendix G of the CEQA Guidelines states that a significant impact related to global climate change and GHG emissions would occur if implementation of the proposed project would:

- A. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
- B. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

The County of San Diego has established a screening threshold of 900 MT CO₂e per year as a project-level GHG screening threshold that would apply to operational and construction emissions from land use development projects (San Diego County 2015). The screening threshold of 900 MT CO₂e per year is based on the California Air Pollution Control Officers Association (CAPCOA) white paper (CAPCOA 2010). This analysis conservatively compares the annual construction and operational emissions for the proposed project and alternatives to the threshold of 900 MT CO₂e per year. The screening threshold is considered conservative because it is lower than other adopted or recommended GHG thresholds of significance across the state (e.g., 1,100 MT CO₂e/year for the Sacramento Metropolitan Air Quality Management District and 1,150 MT CO₂e/year for the San Luis Obispo County Air Pollution Control District). It is not the intent of the County to adopt any of the above-listed mass emissions limits as a numeric threshold for the proposed project; rather, this additional information is provided to put project-generated GHG emissions in the appropriate statewide context.

If the project exceeds 900 MT CO₂e per year, then the project would have a cumulatively considerable contribution to climate change impacts if it would result in a net increase of construction and operational greenhouse gas emissions, either directly or indirectly, and if the project would incorporate mitigation that achieves less than a 16 percent total reduction compared to unmitigated emissions (San Diego County 2015).

NEPA

There are no federally-applicable thresholds for the evaluation of GHG emissions. The Council on Environmental Quality (CEQ) guidance proposes 25,000 MT CO₂e per year as a useful indicator to determine whether additional analysis of climate change impacts may be required.

Therefore, the threshold of 25,000 MT CO₂e per year will be used to analyze emissions under NEPA.

Sea Level Rise and Extreme Events

Section 15126.2 of the CEQA Guidelines states that “the EIR should evaluate any potentially significant impacts of locating development in other areas susceptible to hazardous conditions (e.g., floodplains, coastlines, wildfire risk areas) as identified in authoritative hazard maps, risk assessments or in land use plans addressing such hazards areas.” In March 2012, the California State Coastal Conservancy (SCC) issued a guidance document for projects funded by the SCC for assessing impacts and vulnerabilities of a project subject to sea level rise and extreme events. The SCC recommends a risk analysis approach to evaluate the ability of a project to adapt or cope with sea level rise over time, including implementation of project design features that would reduce risks. Draft sea level rise policy guidance has also been published by the CCC (CCC 2013), which emphasizes the use of soft solutions such as beach replenishment as a component of shoreline protection, and recommends habitat restoration and enhancement projects be designed to withstand impacts of sea level rise and adapt to future conditions, specifically in the development of LCPs.

On November 9, 2011, the Second District Court of Appeals held that a lead agency is not required to analyze the impact of the environment on a proposed project under CEQA (*Ballona Wetlands Land Trust et al. v. City of Los Angeles*). Even though the requirements for analyzing the impact of the environment on a project continue to be litigated, this analysis also includes an evaluation of the project’s vulnerability to sea level rise and extreme events for informational purposes only. This approach is consistent with Executive Order S-13-08, which recommends consideration of sea level rise to assess project vulnerability.

3.16.3 ENVIRONMENTAL CONSEQUENCES

Greenhouse Gas Emissions

Lagoon Restoration and Material Disposal

This analysis focuses on the direct and indirect GHG emissions resulting from construction of the project and subsequent maintenance activities, including construction equipment, worker vehicle trips, waste generation, and fuel use and electricity consumption from other equipment. GHG emissions due to the proposed action would be associated with construction and ongoing maintenance. Construction-related emissions would be associated with dredging and vegetation removal equipment, construction vehicles, and employee commute trips. Construction emissions

would be temporary and would cease upon completion of the proposed restoration project. Operational emissions would be associated with infrequent maintenance and would primarily involve worker vehicle trips.

Emissions from the operation of diesel-fueled off-road equipment were estimated by multiplying peak daily usage (i.e., hours per day) by equipment-specific emission factors and equipment-specific load factors consistent with the ARB's off-road mobile source emission inventory model, OFFROAD. GHG emissions from on-road motor vehicles were estimated using EMFAC2011 mobile source emission factors, which includes emission factors for vehicles in San Diego County. Worker and heavy-duty truck trips were estimated based on data provided in the Traffic Impact Analysis for San Elijo Lagoon Restoration Project (Appendix J). Electricity-related emissions were estimated using SDG&E emissions factors for 2009. Other detailed assumptions are provided in Appendix K.

Consistent with Section 3.11 Air Quality, this analysis evaluates lagoon restoration and materials disposal together. Climate change and GHG emissions are a cumulative impact and therefore emissions associated with individual project components must be evaluated together. The project may use a diesel or electric engine; therefore, emissions associated with each engine type are evaluated.

CEQA Analysis

Alternative 2A

Temporary

As shown in Table 3.16-2, construction emissions using a diesel dredge would total 29,177 MT CO₂e over the 36-month construction period, and the maximum emissions in a single year were estimated to be 9,480 MT CO₂e in 2017. With an electric dredge, construction emissions would total 30,266 MT CO₂e over the construction period, and the maximum emissions in a single year are estimated to be 9,813 MT CO₂e in 2017. The annual construction-related GHG emissions would exceed the screening threshold of 900 MT of CO₂e per year. **Therefore, this impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-2
Construction-Related Greenhouse Gas Emissions
for Alternative 2A

	Annual Emissions (MT CO ₂ e)							
	2016		2017		2018		2019	
	Diesel	Electric	Diesel	Electric	Diesel	Electric	Diesel	Electric
Mobilization/Demobilization/ Site Preparation	251	251					173	173
Construction Equipment	2,632	2,632	4,806	4,806	4,127	4,127	2,209	2,209
Dredging	2,386	2,564	4,474	4,807	4,589	4,931	3,195	3,433
Materials Disposal	134	134	200	200				
Annual Total	5,403	5,580	9,480	9,813	8,717	9,058	5,577	5,815
Total Emissions								
<i>Diesel</i>								29,177
<i>Electric</i>								30,266

¹ Dredging may use either a diesel or electric engine; therefore, both are analyzed in this analysis. Other emissions would be equal.

Source: Modeled by AECOM 2014; for more detail see Appendix K

ARB's Scoping Plan includes measures to meet California's goal of reducing emissions to 1990 levels by 2020 and also reiterates the state's role in the long-term goal established in Executive Order S-3-05, which is to reduce GHG emissions to 80 percent below 1990 levels by 2050. According to ARB, the 2020 goal was established as an achievable, mid-term target, and the 2050 GHG emissions reduction goal represents the level scientists believe is necessary to stabilize the climate (ARB 2008).

ARB's Scoping Plan includes measures that would indirectly address GHG emissions levels associated with construction activities, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a low carbon fuel standard (LCFS). Policies formulated under the mandate of AB 32 that are applicable to construction-related activities are assumed to be implemented during construction of the project.

The measures in the Scoping Plan also put California on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels. Implementing light-duty vehicle GHG emission standards, LCFS, regional transportation-related GHG targets, and the Renewable Portfolio Standard (RPS) as set forth in the Scoping Plan would continue to achieve reductions through at least 2030. However, the Scoping Plan does not recommend additional measures for meeting specific GHG emissions limits beyond 2020 at this time. The Scoping Plan is currently being updated, and additional information on revised measures is not available at the time this analysis was developed.

The County of San Diego does not have a "standard" list of policies or mitigation measures that would be required for construction projects with potentially significant GHG emissions impacts

(County of San Diego 2012). Therefore, the proposed project would not conflict with County of San Diego GHG policies.

Neither the County nor any other agency with jurisdiction over the proposed project has adopted climate change or GHG reduction measures with which the proposed project would conflict. Moreover, construction emissions would be temporary and would cease at the completion of construction activities. Therefore, the proposed project would not conflict with existing plans, policies, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Permanent

As noted above, maintenance activities would occur every 3 years and would include dredging, construction equipment, and worker vehicle trips. As shown in Table 3.16-3, the emissions associated with regular maintenance using a diesel-engine dredge were estimated at 3,686 MT CO₂e. For an electric-engine dredge, regular maintenance would result in 3,856 MT CO₂e.

**Table 3.16-3
Maintenance-Related Greenhouse Gas Emissions
for Alternative 2A**

	Maintenance Emissions (MT CO ₂ e)	
	Diesel	Electric
Construction Equipment	1,398	1,398
Dredging	2,288	2,458
Total Maintenance Emissions	3,686	3,856

¹ Dredging may use either a diesel or electric engine; therefore, both are analyzed in this analysis. Other emissions would be equal.

Source: Modeled by AECOM 2014; for more detail see Appendix K

State and federal programs would result in the reduction of GHG emissions, especially for operational emissions that would occur after the initial construction period. Existing programs for air quality improvement in California, including the Diesel Risk Reduction Plan and the 2007 SIP, would result in the accelerated phase-in of cleaner technology for virtually all of California's diesel engine fleets, including construction equipment (ARB 2008). The NHTSA fuel economy standards for medium- and heavy-duty engines will lower emissions for engines of model years 2014 and later. Measures implemented under these plans are likely to result in more GHG efficient off-road construction equipment and on-road vehicles.

If an electric engine is used for dredging, emissions associated with the use of electricity would be reduced from continued implementation of the RPS. The source of electricity (e.g., renewable energy) affects the amount of GHG emission estimates associated with the proposed project. Electricity-based emissions account for approximately 50 percent of construction emissions and 65 percent of maintenance emissions under the electric dredge scenario; therefore, depending on the pace of implementation of the RPS by SDG&E, fewer emissions may result from use of an electric dredge than reported above.

However, additional reductions associated with state and federal programs were not included in the estimates of GHG emissions. As shown in Table 3.16-3, the annual maintenance emissions would exceed the screening threshold of 900 MT CO₂e per year. **Therefore, the impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

As discussed earlier, ARB's Scoping Plan includes measures that would indirectly address GHG emissions levels associated with construction activities, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of an LCFS. Policies formulated by ARB under the mandate of AB 32 that are applicable to construction-related activities are required for projects and are therefore assumed to be implemented during maintenance and operational activities.

Neither the County nor any other agency with jurisdiction over the proposed project has adopted climate change or GHG reduction measures with which the proposed project would conflict. Therefore, the operational and maintenance activities for the proposed project would not conflict with existing plans, policies, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Alternative 1B

Temporary

As shown in Table 3.16-4, construction emissions under Alternative 1B using a diesel dredge would total 28,090 MT CO₂e over the proposed construction period, and the maximum emissions in a single year are estimated to be 9,076 MT CO₂e in 2017. Total construction emissions with an electric dredge would result in 29,178 MT CO₂e over the construction period. The annual construction GHG emissions would exceed the screening threshold of 900 MT of CO₂e per year. **Therefore, the impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-4
Construction-Related Greenhouse Gas Emissions for Alternative 1B

	Annual Emissions (MT CO ₂ e)							
	2016		2017		2018		2019	
	Diesel	Electric	Diesel	Electric	Diesel	Electric	Diesel	Electric
Mobilization/Demobilization/ Site Preparation	251	251					173	173
Construction Equipment	2,447	2,447	4,401	4,401	3,575	3,575	2,264	2,264
Dredging	2,386	2,564	4,474	4,807	4,589	4,931	3,195	3,433
Materials Disposal	134	134	200	200				
Annual Total	5,218	5,396	9,076	9,408	8,164	8,505	5,632	5,869
Total Emissions								
<i>Diesel</i>								28,090
<i>Electric</i>								29,178

Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, construction activities associated with Alternative 1B would not conflict with ARB's Scoping Plan. Therefore, Alternative 1B would not conflict with existing policies, plans, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Permanent

Maintenance activities under Alternative 1B would occur annually and would include construction equipment and worker vehicle trips. However, Alternative 1B would not require use of a dredge. As shown in Table 3.16-5, the annual maintenance emissions would not exceed the threshold of 900 MT CO₂e per year. Therefore, **this impact would not be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-5
Maintenance-Related Greenhouse Gas Emissions for Alternative 1B

	Maintenance Emissions (MT CO₂e/yr)
Construction Equipment	106
Total Annual Emissions	106

Notes: MT CO₂e/yr = metric tons of carbon dioxide equivalent per year.

Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, the operational and maintenance activities associated with Alternative 1B would not conflict with ARB's Scoping Plan. Therefore, operational and maintenance activities associated with Alternative 1B would not conflict with existing policies, plans, or

regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Alternative 1A

Temporary

As shown in Table 3.16-6, construction emissions over the 3-year period under Alternative 1A would total 9,670 MT CO₂e using a diesel dredge and 9,822 MT CO₂e with an electric dredge. The annual construction GHG emissions in would exceed the threshold of 2,500 MT of CO₂e per year. **Therefore, the impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

**Table 3.16-6
Construction-Related Greenhouse Gas Emissions for Alternative 1A**

	2016		2017		2018	
	Diesel	Electric	Diesel	Electric	Diesel	Electric
Mobilization/Demobilization/ Site Preparation	251	251	251	251	173	173
Construction Equipment	2,563	2,563	2,563	2,563	994	994
Dredging	809	869	809	869	404	434
Materials Disposal	342	342	342	342	171	171
Annual Total	3,964	4,025	3,964	4,025	1,742	1,772
Total Emissions						
<i>Diesel</i>						9,670
<i>Electric</i>						9,822

¹ Dredging may use either a diesel or electric engine; therefore, both are analyzed in this analysis. Other emissions would be equal.

Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, the construction activities associated with Alternative 1A would not conflict with ARB's Scoping Plan. Therefore, Alternative 1A would not conflict with existing policies, plans, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Permanent

Minimal annual maintenance would occur under Alternative 1A and would include construction equipment and worker vehicle trips. Alternative 1A would not require use of a dredge. As shown in Table 3.16-7, the annual maintenance emissions would not exceed the screening threshold of 900 MT CO₂e per year. Therefore, **this impact would not be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-7
Maintenance-Related Greenhouse Gas Emissions for Alternative 1A

	Maintenance Emissions (MT CO₂e/yr)
Construction Equipment	92
Total Annual Emissions	92

Notes: MT CO₂e = metric tons of carbon dioxide equivalent.

Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, the operational and maintenance activities associated with Alternative 1A would not conflict with ARB's Scoping Plan. Therefore, operational and maintenance activities associated with Alternative 1A would not conflict with existing policies, plans, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would result in continued periodic maintenance at the project site and would therefore result in continued periodic GHG emissions. Under this alternative, no dredging or excavation would occur to improve tidal circulation, channel clearing, or other comprehensive actions to improve tidal exchange or upstream flooding. The lagoon inlet would remain in its existing location. However, maintenance is intermittent and dependent on funding. The No Project/No Federal Action Alternative would result in continued vehicular and equipment activity primarily related to maintenance of the inlet opening. Since no increase in activities would occur under the No Project/No Federal Action Alternative, GHG emissions would also not increase. Due to improved emission standards, emissions would be anticipated to be lower in future years. Therefore, **this impact would not be a considerable contribution to the cumulative climate change impact and would be less than significant (Criteria A and B).**

NEPA Analysis

None of the alternatives analyzed would emit more than 25,000 MT CO₂e per year. According to CEQ guidance, no further analysis is required. Therefore, **no substantial adverse direct or indirect effects would occur.**

Sea Level Rise and Extreme Events

Lagoon Restoration

San Elijo Lagoon will be subject to climate change regardless of the alternative implemented. Vulnerabilities would be based on changes in temperature, precipitation (timing and amount), drought, storm intensity, extreme heat days, sea level rise, and storm surges. In general, increased sea level could allow high tides to reach farther into low-lying areas; flooding could persist longer and be more difficult to drain; higher water levels may cause greater erosion; and prolonged drought may affect species survival.

The regional climatic and physical characteristics subject the lagoon to many of the changes that are anticipated. The lagoon is often inundated due to the lack of a fully functional inlet. The effects of inundation would be similar to those caused by flooding or sea level rise. Extreme temperatures and drought also occur in the lagoon and while their frequency may increase due to climate change, much of the existing flora and fauna is adapted to fluctuations in their environment. The ocean would moderate extreme temperature changes to some extent. Species within the lagoon are expected to be resilient to short periods (days to weeks) of extreme heat or cold, because these species are already subjected to these periodic conditions (e.g., Santa Ana conditions) and a slight increase in frequency is unlikely to result in major biota losses.

Projected sea level rise scenarios as discussed in Section 3.16.1 and the *Sea Level Rise Analysis* prepared for the project (M&N 2010) guided the restoration planning and engineering for the proposed project. The restoration plan includes areas of higher elevation (e.g., man-made transitional areas) that are intended by design to transition from upland to wetland under sea level rise, or from a higher elevation wetland to a lower elevation. Additionally, the lagoon currently has existing areas outside of tidal influence that are anticipated to convert to tidally influenced wetland as sea level rise occurs (e.g., upland slopes surrounding lagoon and freshwater/brackish wetland areas within the east basin). As conversion occurs, habitat distribution within the lagoon would shift. Table 3.16-8 identifies predicted habitat distributions under each alternative at 2065, assuming a sea level rise of 2 feet. This predicted distribution is relatively speculative, however, as it accounts for only sea level rise, which is one of many anticipated components of climate change. Other trends, such as changes in rainfall and weather patterns, are extremely difficult to predict and are not accounted for in this prediction. Additional adaptive capacity would depend on the alternative chosen and the adaptive management plan. Ongoing maintenance activities are anticipated for each alternative and would be guided by the management plan. That management plan would address specific risks and uncertainties, including those related to climate change. The plan would include feasible adaptation strategies that can be implemented as risks are identified. This would include establishing indicator data

that would be monitored regularly, such as the ordinary high water mark; and minimizing loss by allowing habitat migration or redistributing dredged sediment to raise elevations, as necessary. These adaptive management strategies would emphasize maintenance of the ecological functions and services of San Elijo Lagoon, rather than maintenance of a specific habitat distribution (e.g., acreage of each habitat type).

Table 3.16-8
Approximate Future Habitat Distribution (2065) under Sea Level Rise

Habitat Type	Alternative 2A		Alternative 1B		Alternative 1A		No Project/ No Federal Action	
	Post-Restoration	2065	Post-Restoration	2065	Post-Restoration	2065	Equilibrium	2065
Avian Nesting Areas	2	2	2	2	2	2	0	0
Mudflat	102	151	71	147	25	161	29	161
Low-Marsh	23	86	51	75	44	48	51	55
Mid-Marsh	124	101	98	77	140	92	107	69
High-Marsh (Tidal)	29	24	44	36	28	54	47	24
High-Marsh (Nontidal)	78	63	80	67	117	86	120	107
Salt Panne	17	2	30	2	35	3	37	5
Freshwater/Brackish Marsh	96	56	99	64	121	69	131	87
Open Water/Tidal Channels and Basins	74	83	67	94	33	44	24	48
Riparian	67	54	67	55	70	57	71	60
Coastal Strand	5	1	5	1	5	1	5	1
Upland & Others	292	300	295	301	299	304	299	304
Beach	14	14	15	15	15	15	15	15
Berms and Roads	24	23	24	23	24	23	23	23
Transitional (man-made)	12	1	12	1	2	1	0	0
Subtotal – Tidally Influenced Area¹	352	445	331	429	270	399	258	357
Subtotal – Nontidally Influenced Area²	608	515	629	531	690	561	710	611
Total Acreage	960	960	960	960	960	960	960	960

¹ Tidally influenced areas include open water/tidal channels and basins, mudflat, low-marsh, mid-marsh, and high-marsh (tidal).

² Nontidally influenced areas include avian nesting area, high-marsh (nontidal), salt panne, freshwater/brackish marsh, riparian, coastal strand, upland and others, beach, berms and roads, and transitional (man-made).

³ Totals may not add due to rounding.

Alternative 2A

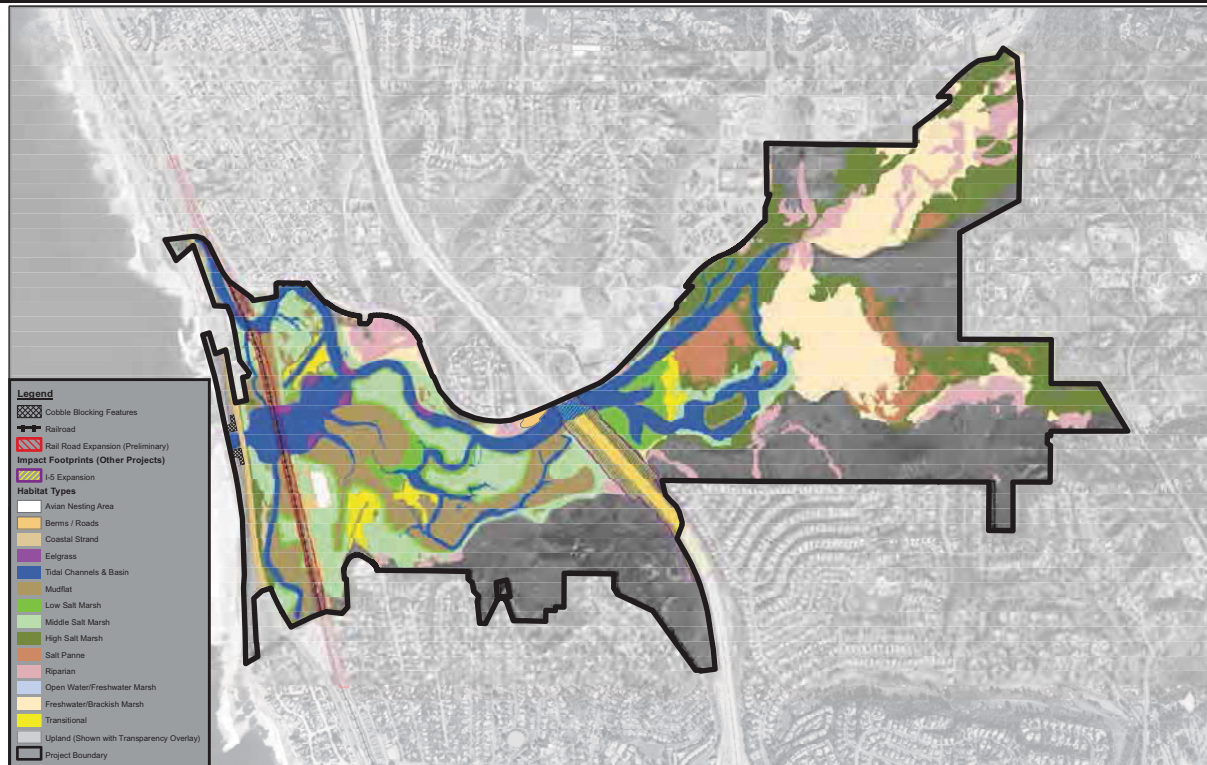
Alternative 2A would restore the tidal range within the lagoon to be more consistent with that of the ocean (Table 3.2-1) and lower the maximum 100-year flood elevation (Table 3.2-2). Using the sea level rise estimation method described in the Hydrology/Hydraulics Study (Appendix D), which adds 2 feet to the 2015 flood elevations under each alternative to estimate 2065 conditions, Alternative 2A would continue to provide flood protection under sea level rise

compared to the No Project/No Federal Action Alternative. In a 2065 100-year storm, only one portion of the east basin would be expected to flood. The tidal range would increase over existing conditions and habitats would be restored to support a diverse mix of critical species. Figure 3.16-2 illustrates the generalized habitat distribution change over time (from existing conditions to 2065) with sea level rise. Generally, the balance of habitats in the east basin would shift more toward salt marsh, with anticipated decreases in freshwater and brackish marsh, as well as salt panne, as shown in Table 3.16-8. The central basin would continue to support a mix of mudflat, low-marsh, and mid-marsh, with increases in subtidal, mudflat, and low-marsh as higher elevation habitats (e.g. mid- and high-marsh, as well as transitional) decrease.

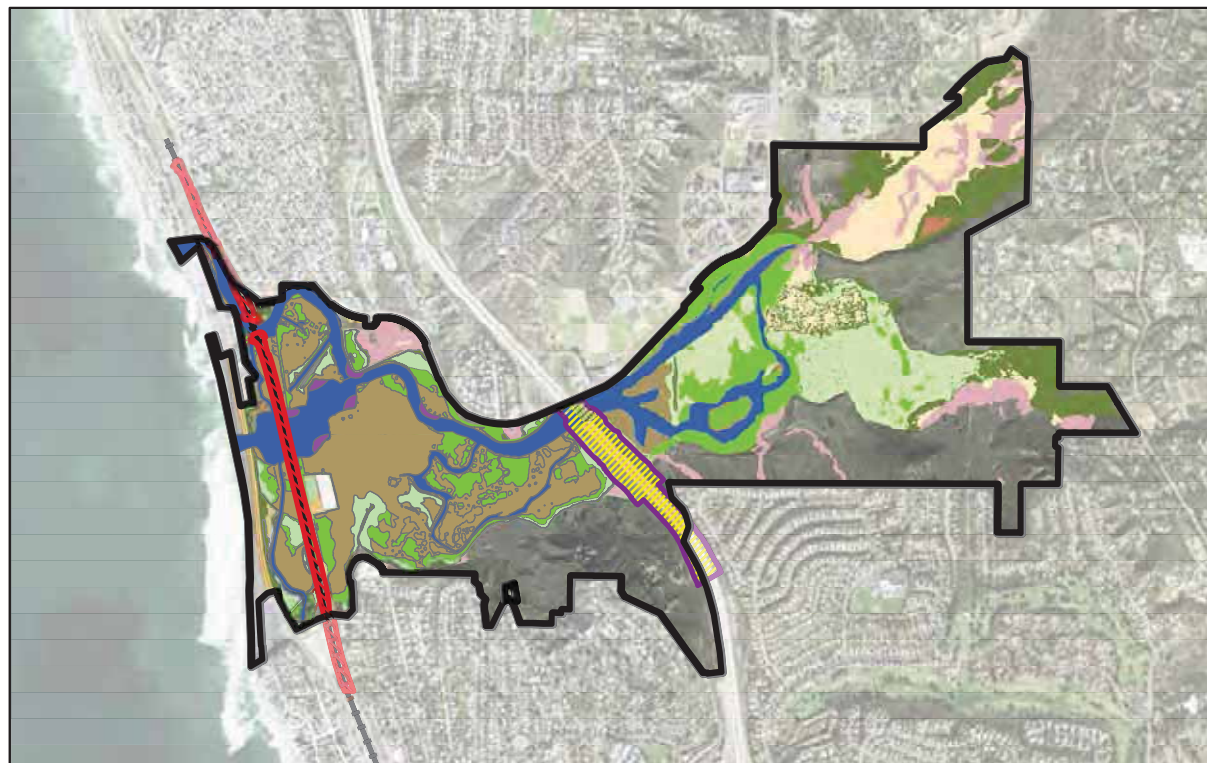
Maintaining a consistent tidal exchange with the ocean would enhance the ability of the lagoon to slowly adapt to changes in sea level over time. Lowered flood elevation would provide resiliency against floods, other extreme events, and sea level rise. Although, under extreme sea level increases, the lagoon may be inundated, Alternative 2A would include an adaptive management plan identifying strategies that could provide additional habitat by selectively redistributing sediment to maintain habitats or facilitate relocation of habitats to higher elevations. In addition, maintaining healthy wetlands protects shorelines from flood and erosion by absorbing waves and slowing the flow of the high water mark. Overall, Alternative 2A would improve the ability of the project area to respond to long-term climate impacts, such as increased sea level rise.

Alternative 1B

Similar to Alternative 2A, Alternative 1B would increase the tidal range within the lagoon and generally reduce the maximum flood elevation of the lagoon, although not to the same extent as Alternative 2A. Alternative 1B would be expected to lead to water levels up to a foot above the elevation of Manchester Avenue in a 2065 100-year storm, although anticipated extent of flooding would be much less than that anticipated under the No Project/No Federal Action Alternative. Flooding would be expected to occur in the east basin and a portion of the central basin. Figure 3.16-3 illustrates the generalized habitat distribution change over time (from existing conditions to 2065) with sea level rise. Similar to Alternative 2A, the balance of habitats in the east basin would generally shift more toward salt marsh, with anticipated decreases in freshwater and brackish marsh, as well as salt panne, as shown in Table 3.16-8. The central basin would continue to support a mix of mudflat, low-marsh, and mid-marsh, with increases in subtidal, mudflat, and low-marsh as higher elevation habitats (e.g. mid- and high-marsh, as well as transitional) decrease. Maintenance activities would occur annually, providing additional opportunity to respond to long-term climate change impacts.



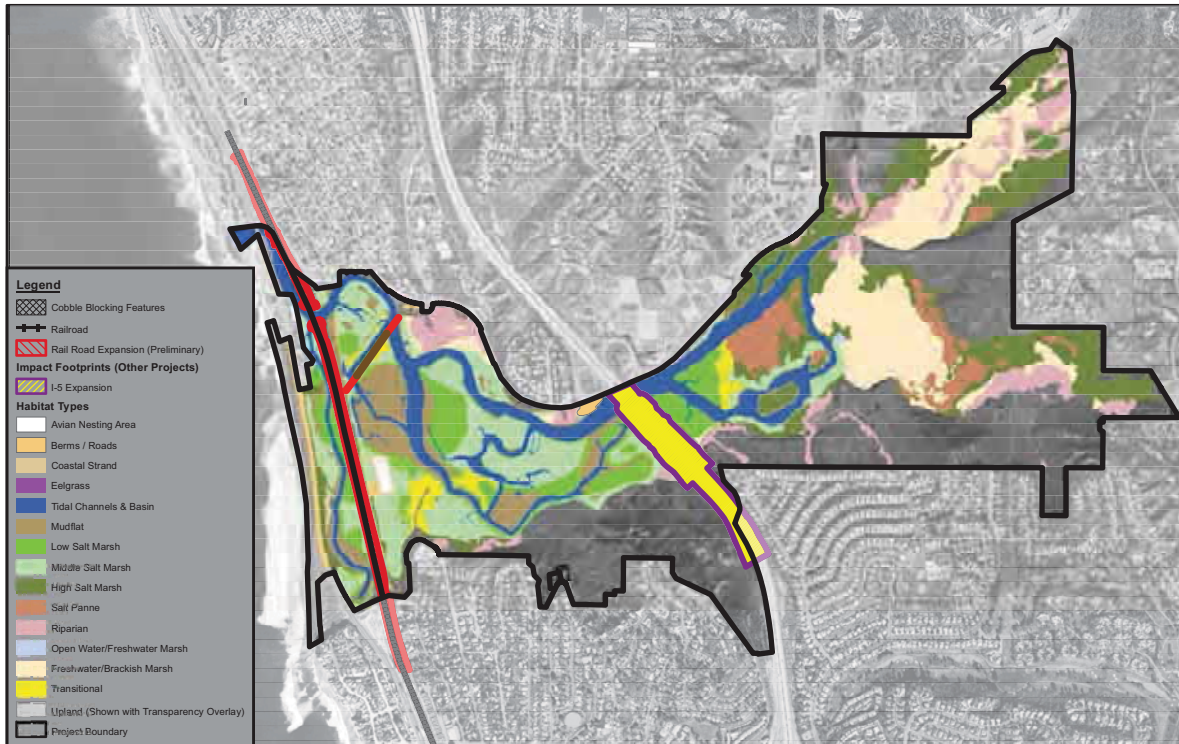
Modeled Post-Restoration Conditions



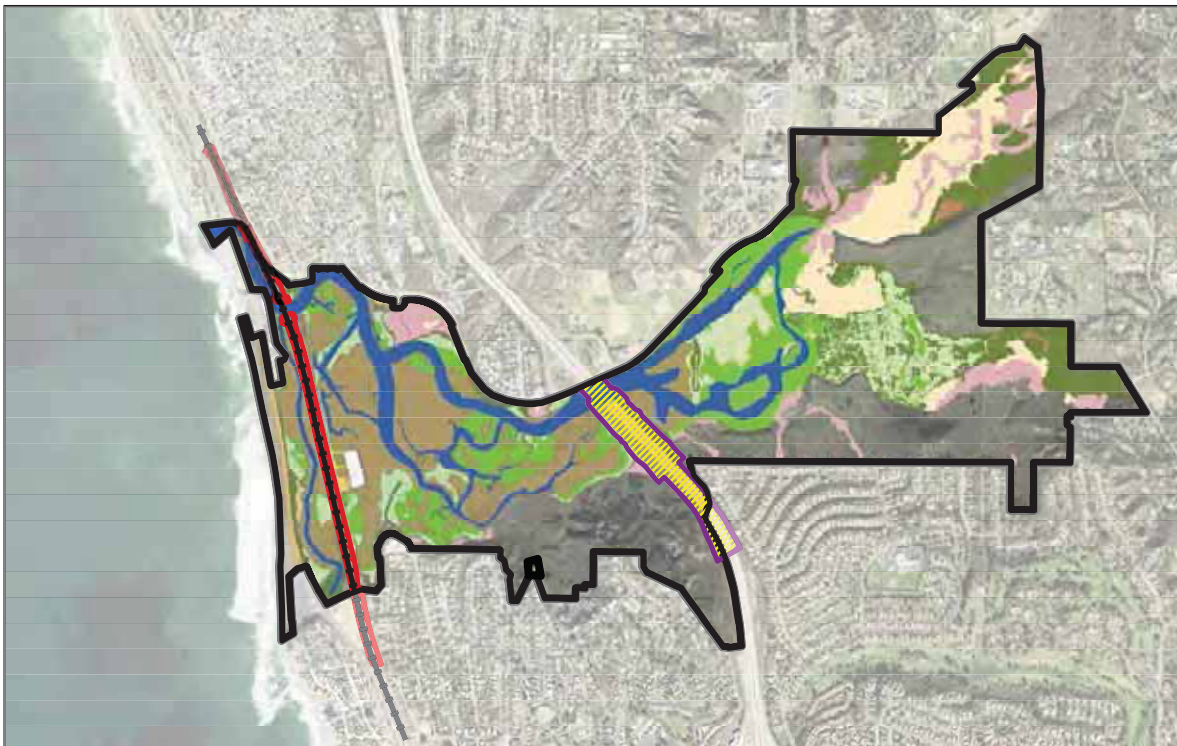
Modeled 2065 Conditions



Figure 3.16-2
Alternative 2A Generalized Habitat Distribution With Sea Level Rise



Modeled Post-Restoration Conditions



Modeled 2065 Conditions



Figure 3.16-3
Alternative 1B Generalized Habitat Distribution With Sea Level Rise

Alternative 1A

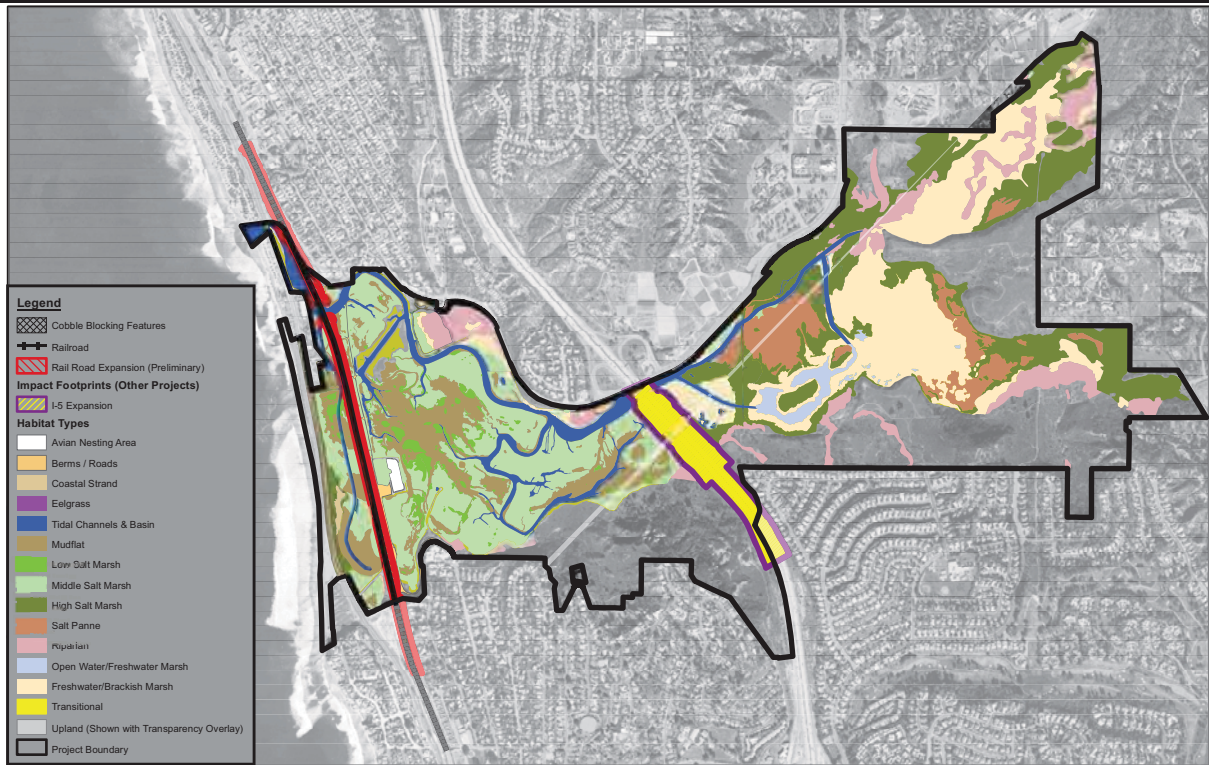
Alternative 1A would provide better tidal exchange between the lagoon and ocean, increasing tidal range in the lagoon and enhancing its ability to respond slowly to changes in sea level, although likely not to the same extent as Alternative 1B or Alternative 2A. While Alternative 1A offers improvement in flood elevation over existing conditions, sea level rise under 1A would result in water levels up to 4 feet above the elevation of Manchester Avenue throughout the central and east basins in a 2065 100-year storm. Figure 3.16-4 illustrates the generalized habitat distribution change over time (from existing conditions to 2065) with sea level rise. Habitat is anticipated to transition under Alternative 1A, but to a lesser degree than predicted under Alternatives 2A and 1B due to the continued hydraulic inefficiencies in the lagoon. Table 3.16-8 shows the predicted habitat distribution under Alternative 1A; freshwater and brackish marsh and salt panne areas would be anticipated to convert to salt marsh, and the central basin would increase in mudflat areas. The flood elevation would improve in some areas but decline in the east basin. The lagoon would benefit from continued opening of the existing inlet and annual maintenance, allowing additional opportunity to respond to long-term climate change impacts.

No Project/No Federal Action Alternative

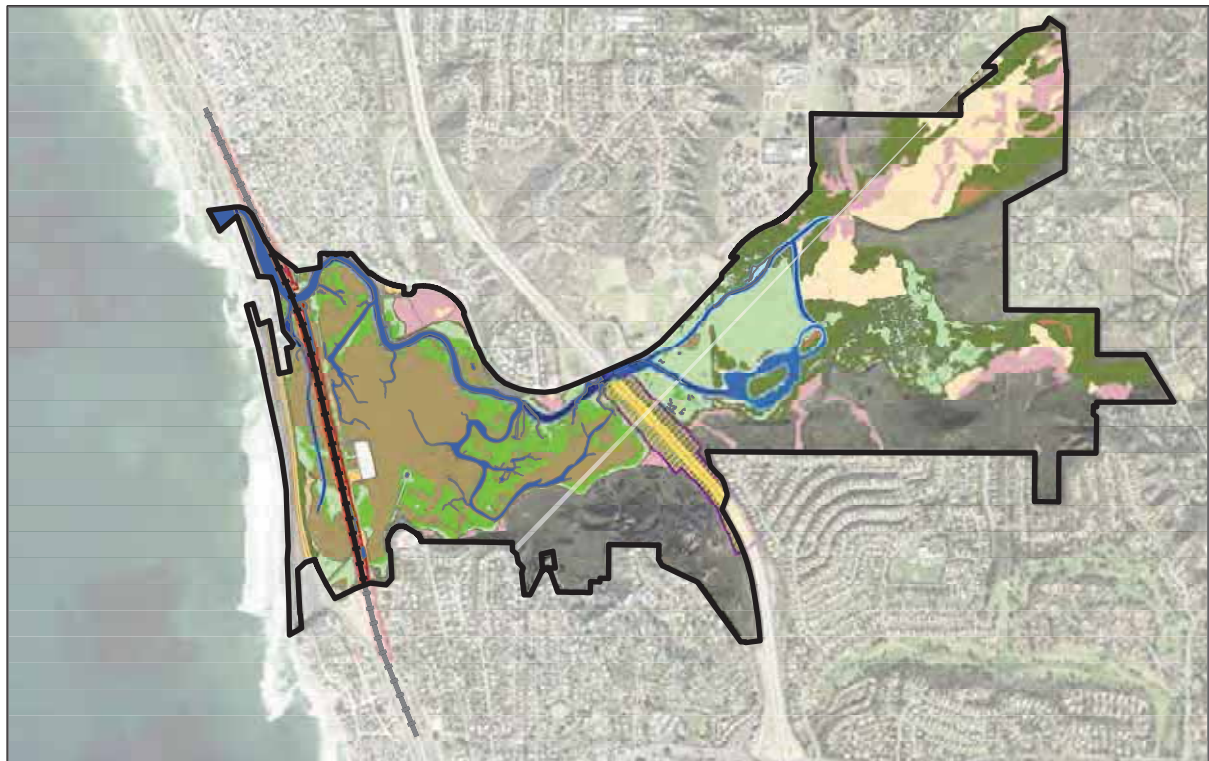
The lagoon would function similar to current conditions under a No Project/No Federal Action Alternative. As shown in Figures 3.16-1 and 3.16-5, sea level rise would affect water levels and habitat distribution in the project area. When future sea level rise is taken into consideration, water levels would be expected to rise up to 5 feet above Manchester Avenue throughout the east and central basins in 2065 100-year flood conditions. The lagoon would continue to be inundated with freshwater from the east and have limited capacity to drain the water through flow to the ocean, converting the lagoon to open water habitat. Conversely, tidal ranges consistent with the ocean would not be maintained and would not provide a buffer to storm surges or flood events. Critical habitats could shift to freshwater habitats or more subtidal habitats, depending on drainage within the lagoon. Table 3.16-8 identifies predicted habitat distribution within the lagoon; while salt panne would decrease as it converts to salt marsh habitats, the eastern portion of the east basin would not be anticipated to convert to salt marsh due to the continued hydraulic inefficiencies in the east basin.

Materials Disposal/Reuse

The vast majority of material from the restoration project would be placed either offshore, nearshore, or onshore depending upon the alternative in the very near term (2016 or 2017), which is well before extreme sea level rise or extreme events associated with climate change



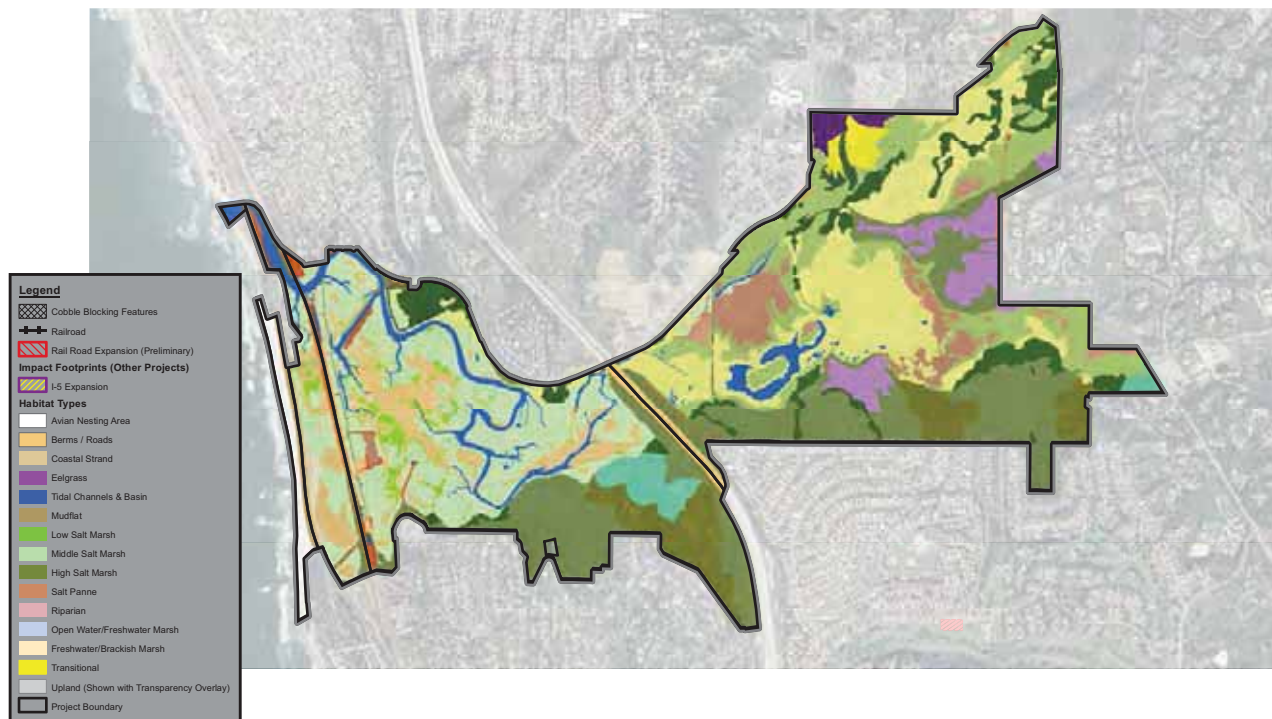
Modeled Post-Restoration Conditions



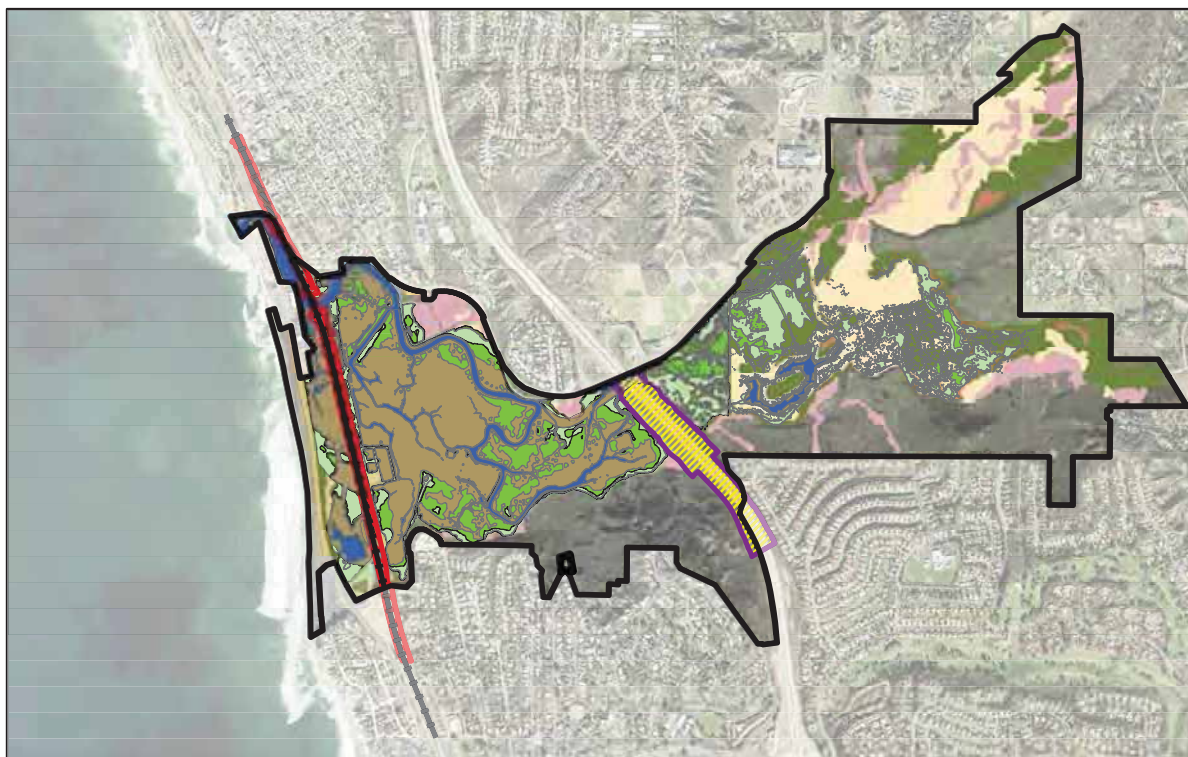
Modeled 2065 Conditions



Figure 3.16-4
Alternative 1A Generalized Habitat Distribution With Sea Level Rise



Existing Conditions (2012)



Modeled 2065 Conditions



Figure 3.16-5
No Project Generalized Habitat Distribution With Sea Level Rise

would be noticeable. However, it is possible that increased beach widths from onshore placement could provide temporary localized protection for structures on top of eroding bluffs, or infrastructure close to sea level and subject to ocean action, placed material is anticipated to disperse throughout the littoral cell and the volume of sand added to the entire littoral system from this one event would not be large enough to be noticeable over time. Materials placement associated with periodic inlet maintenance (30,000 to 300,000 cy) would also provide localized temporary benefits.

3.16.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Construction-related and maintenance GHG emissions for Alternative 2A would exceed the recommended level of significance. Construction-related GHG emissions for Alternative 1B and Alternative 1A would exceed the recommended level of significance. As described in Table 2-26, project design features would be incorporated related to equipment maintenance and idling time to reduce GHG emissions associated with the project alternatives. Mitigation Measures AQ-1 through AQ-3 could also result in a reduction in GHG emissions. Although the tier engine standards are primarily based on improvements in NO_x and PM emission levels, there would likely be benefits associated with the improved fuel efficiency and associated GHG emissions from the use of newer off-road engines. The following measures are also recommended to reduce GHG emissions for each alternative:

- GHG-1 On-site material hauling shall be performed with trucks equipped with on-road engines to the extent practicable.
- GHG-2 Limit deliveries of materials and equipment to the site to off-peak traffic congestion hours to the extent practicable.
- GHG-3 Restrict material hauling on public roadways to off-peak traffic congestion hours to the extent possible. During construction scheduling and execution minimize, to the extent possible, uses of public roadways that would increase traffic congestion.
- GHG-4 Use high-efficiency lighting and Energy Star-compliant heating and cooling units in construction trailers. Implement procedures for turning off computers, lights, air conditioners, heaters, and other equipment contained in these trailers each day at close of business.

The project currently proposes the use of a diesel dredge and/or an electric dredge. The potential benefit of requiring electric dredge use to reduce GHG emissions was evaluated. However, as described in Section 3.16.3, GHG emissions from an electric dredge and a diesel dredge do not

differ substantially. Therefore, the sole use of an electric dredge was not considered an effective mitigation measure for GHG emissions. No additional feasible mitigation has been identified for GHG emissions from construction or operational activities.

3.16.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA: Based on the level of construction activities anticipated with each project alternative, even with implementation of Mitigation Measures GHG-1 through GHG-4, construction emissions for all project alternatives would continue to exceed the screening threshold of 900 MT CO₂e per year. While Mitigation Measures GHG-1 through GHG-4 would reduce GHG emissions associated with the project alternatives, the level of potential reductions in GHG emissions cannot be accurately estimated. It is difficult to accurately estimate GHG emission reductions from construction activities since the type of construction equipment and fuel can affect total emissions (e.g., equipment using natural gas or other alternative fuels could actually increase GHG emissions compared to diesel engines). In addition, the annual emission reductions may vary based on the construction schedule and the extent to which the measures are implemented (e.g., number of trucks operating with on-road engines). Therefore, implementation of Mitigation Measures GHG-1 through GHG-4 would not be anticipated to reduce emissions associated with construction of the project alternatives by more than 16 percent compared to the unmitigated emissions. This impact would be a considerable contribution to cumulative climate change and would remain significant and unavoidable.

NEPA: The estimated emissions for all project alternatives would not exceed the CEQ emission thresholds. Therefore, no substantial adverse direct or indirect effects would occur.

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CHAPTER 4.0

COMPARISON OF ALTERNATIVES

4.1 INTRODUCTION

This chapter compares the alternatives described in Chapter 2 and evaluated in Sections 3.1 through 3.16. Both CEQA and NEPA require analysis of a reasonable range of alternatives. Accordingly, this draft EIR/EIS analyzes alternatives that feasibly meet the objectives of the proposed project, along with the No Project Alternative (CEQA) and the No Federal Action Alternative (NEPA). Each alternative is analyzed in equal level of detail. This level of analysis is included to provide sufficient information and meaningful detail about the environmental effects of each alternative so that informed decision-making can occur.

As described in Chapter 2, the proposed project has two components: (1) restoration of San Elijo Lagoon and (2) materials disposal/reuse of dredged materials from the lagoon. These project components were analyzed independently from one another throughout the EIR/EIS, where appropriate. The lagoon restoration alternatives include:

- Alternative 2A
- Alternative 1B
- Alternative 1A
- No Project/No Federal Action Alternative

The materials disposal/reuse scenarios are described in Chapter 2, Table 2-21. They include options for materials placement either offshore, nearshore, or onshore and are dependent on the volume and quality of material.

Other alternatives that were considered but eliminated during the alternatives screening process are summarized in Section 2.2.2.

4.2 EVALUATION OF ALTERNATIVES

CEQA

The CEQA Guidelines (14 CCR Section 15126.6) require that an EIR present a range of reasonable alternatives to the project, or to the location of the project, that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any significant

effects of the project. Section 15126.6 of the CEQA Guidelines also requires an evaluation of the comparative merits of the alternatives. An EIR is not required to consider alternatives that are infeasible.

Table 4-1 summarizes the results of the CEQA impact analysis for each resource area.

Table 4-1
CEQA Significance Conclusions by Alternative

Environmental Resource Area	Alternative 2A		Alternative 1B		Alternative 1A		No Project/No Federal Action	
	LR	MP	LR	MP	LR	MP	LR	MP
Land Use/Recreation	L	L	L	L	L	L	L	L
Hydrology	L	N	L	N	L	N	L	N
Oceanography/Coastal Processes	L	L	L	L	L	L	L	L
Water and Aquatic Sediment Quality	M	L	M	L	M	L	L	L
Geology/Soils	M	L	L	L	L	L	N	N
Biological Resources	S	L	S	L	S	L	L	L
Cultural Resources	M	N	M	N	M	N	N	N
Paleontological Resources	M	N	M	N	M	N	N	N
Visual Resources	S	L	S	L	L	L	N	N
Traffic, Access, and Circulation	S	L	S	L	S	L	N	N
Air Quality	S	–	S	–	S	–	L	–
Noise	S	S	S	S	S	L	N	N
Socioeconomics/Environmental Justice	L	L	L	L	L	L	N	N
Public Services and Utilities	L	L	L	L	L	L	N	N
Hazardous Materials and Public Safety	M	L	M	L	M	L	L	L
Global Climate Change and Greenhouse Gas Emissions	S	–	S	–	L	–	L	–

LR = Lagoon Restoration

MP = Materials Placement

S = Significant unavoidable impact

M = Significant but mitigable to less than significant impact

L = Less than significant impact

N = No impact

– = Lagoon restoration and materials disposal/reuse analyzed together

NEPA

NEPA (40 CFR Section 1502.14[a]) requires that an EIS explore and evaluate a range of reasonable alternatives to the project. The CWA Section 404(b)(1) Guidelines (40 CFR Part 230) also address alternatives, stating that no discharge of dredged or fill material will be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as that alternative does not have other significant adverse

environmental consequences. Chapter 2 of this draft EIR/EIS sets forth potential alternatives to the recommended plan, and Sections 3.1 through 3.16 evaluate their environmental impacts.

Table 4-2 summarizes potential adverse effects identified per NEPA for each resource area.

Table 4-2
NEPA Conclusions by Alternative

Environmental Resource Area	Alternative 2A		Alternative 1B		Alternative 1A		No Project/No Federal Action	
	LR	MP	LR	MP	LR	MP	LR	MP
Land Use/Recreation	N	N	N	N	N	N	N	N
Hydrology	N	N	N	N	N	N	N	N
Oceanography/Coastal Processes	N	N	N	N	N	N	N	N
Water and Aquatic Sediment Quality	N	N	N	N	N	N	N	N
Geology/Soils	N	N	N	N	N	N	N	N
Biological Resources	A	N	A	N	A	N	N	N
Cultural Resources	N	N	N	N	N	N	N	N
Paleontological Resources	N	N	N	N	N	N	N	N
Visual Resources	A	N	A	N	N	N	N	N
Traffic, Access, and Circulation	A	N	A	N	A	N	N	N
Air Quality	N	–	N	–	N	–	N	–
Noise	N	N	N	N	N	N	N	N
Socioeconomics/Environmental Justice	N	N	N	N	N	N	N	N
Public Services and Utilities	N	N	N	N	N	N	N	N
Hazardous Materials and Public Safety	A	N	A	N	A	N	N	N
Global Climate Change and Greenhouse Gas Emissions	N	–	N	–	N	–	N	–

LR = Lagoon Restoration

MP = Materials Placement

A = Substantial adverse effect

N = No substantial adverse effect

– = Lagoon restoration and materials disposal/reuse analyzed together

4.3 ANALYSIS OF IMPACTS OF ALTERNATIVES

Overall, less than significant impacts or impacts that can be mitigated to less than significant under CEQA for all alternatives include land use/recreation, hydrology, oceanography/coastal processes, water and aquatic sediment quality, geology/soils, cultural resources, paleontological resources, socioeconomics/environmental justice, public services and utilities, and hazardous materials and public safety. Exceptions include the significant and unavoidable impacts that would occur for biological resources; visual resources; traffic, access, and circulation; noise; air quality; and global climate change and GHG emissions as detailed in Section 4.3.1 below.

Substantial adverse impacts identified under NEPA include biological resources; visual resources; traffic, access and circulation; and hazardous materials and public safety. Mitigation is proposed for all substantial adverse impacts that would occur.

When comparing the lagoon restoration component and the materials disposal/reuse component of the SELRP, significant and substantial adverse impacts only occur as a result of the lagoon restoration actions for Alternative 2A, Alternative 1B, and Alternative 1A. Under all alternatives, the materials disposal/reuse activities would result in less than significant impacts with no mitigation required, and no substantial adverse impacts would occur.

4.3.1 RESOURCES WITH SIGNIFICANT UNAVOIDABLE IMPACTS

Biological Resources

Restoration construction would result in greater than 50 percent temporal loss of sensitive habitats including coastal salt marsh (low- and mid-), open water, saltpan/open water, and tidal mudflats. Because the temporal loss of these habitats may threaten local populations of sensitive resident species, this short-term direct impact is considered significant and adverse. Additionally, significant short-term impacts were identified for Alternative 2A and Alternative 1B to Belding's savannah sparrow, due to the temporary loss of greater than 50 percent of their nesting habitat. While no feasible mitigation is available for the short-term direct loss of the nesting habitat and the impact would remain significant, the short-term impacts would be balanced out by the long-term benefits of lagoon restoration, as the overall ecological benefits from lagoon restoration would provide long-term improved habitat quality.

Significant and unavoidable short-term noise impacts to sensitive bird species would occur as a result of construction activities under Alternative 2A, Alternative 1B, and Alternative 1A. When in proximity to wildlife, the effects of dredge and other construction noise may disrupt sensitive birds foraging or breeding behavior. The dredge is slow and would be operating in one basin at a time; as such, most birds could relocate to quieter habitat. However, relocation during the breeding season is not feasible for nesting birds and, even with the numerous project design features to reduce noise levels, this is considered a significant and unavoidable impact.

Visual Resources

Significant and unavoidable long-term visual impacts would result from the new inlet and CBFs on either side as proposed for Alternative 2A. The permanent inlet features would introduce highly linear elements into the beach landscape that would result in a substantial contrast from the existing visual environment and beach character for sensitive beachgoers. This significant

unavoidable visual impact would only occur with implementation of Alternative 2A as Alternative 1B, Alternative 1A, and the No Project/No Federal Action Alternative would not include construction of a new inlet and CBFs.

Significant and unavoidable temporary visual impacts would result from the change in visual quality and character of the lagoon for key viewers during construction of Alternative 2A and Alternative 1B. Vegetation would be removed from a large portion of the central basin and substantial landform alteration would occur along with the presence of construction equipment and lighting. Such activities would be temporary but highly visible because of the contrast in color and texture with vegetation being replaced by exposed soil. This significant unavoidable visual impact would only occur with implementation of Alternative 2A and Alternative 1B as Alternative 1A and the No Project/No Federal Action Alternative would result in a less extensive visual change, both temporally and spatially, during lagoon restoration.

Traffic, Access, and Circulation

Significant and unavoidable temporary traffic impacts would result during Coast Highway 101 bridge construction under Alternative 2A and retrofitting under Alternative 1B and Alternative 1A. The significant traffic impacts would occur along segments of Coast Highway 101 and Lomas Santa Fe during construction or retrofitting activities that require restriction of the bridge to two lanes of traffic. These impacts would be temporary, occurring only during new bridge construction or retrofitting activities that require lane closure on the roadway. Traffic would return to normal operating conditions once all four lanes of traffic were fully operational. No other component of the proposed lagoon restoration or materials disposal/reuse would result in significant traffic impacts. All mitigation options were considered and feasible mitigation is included but would not reduce the impact to less than significant. This significant unavoidable traffic impact would occur with implementation of Alternative 2A, Alternative 1B, and Alternative 1A, but the No Project/No Federal Action Alternative would not include Coast Highway 101 bridge construction or retrofitting activities.

Air Quality

Under CEQA, significant and unavoidable temporary construction-related air quality impacts would result during construction activities associated with Alternative 2A, Alternative 1B, and Alternative 1A. Construction-generated ROG and NO_x emissions for all three alternatives would exceed applicable mass emission thresholds, resulting in a significant impact to regional air quality. Feasible mitigation is included but would not reduce the impact to less than significant.

Additionally, Alternative 2A would cause significant and unavoidable operation-related air quality impacts. NO_x emissions associated with maintenance activities under Alternative 2A would exceed the applicable mass emission thresholds, resulting in a significant impact to regional air quality. Feasible mitigation is included but would not reduce the impact to less than significant.

Noise

Due to nighttime dredging and materials placement activities, significant impacts have been identified under CEQA for each of the alternatives due to lagoon restoration activities and materials disposal/reuse activities associated with SELRP. Design features have been incorporated into the project to minimize equipment noise during construction at nearby residences, including housing exposed engines and ensuring equipment has effective mufflers. At materials placement sites, construction would be limited to 3 consecutive nights within a distance that could disturb sleep at a given residence (100 feet). Even with implementation of these measures nighttime construction outside of allowed hours would result in significant impacts. Mitigation such as noise walls and limiting dredging and materials placement activities to daytime hours was considered to reduce this impact but found infeasible.

Global Climate Change and Greenhouse Gas Emissions

Under CEQA, significant GHG emissions would result during construction operations under Alternative 2A and Alternative 1B. Climate change and GHG emissions are a cumulative impact and therefore emissions associated with individual project components of lagoon restoration and materials disposal/reuse must be evaluated together. Emissions would result from construction activities including mobilization/demobilization, site preparation, construction equipment and on-road vehicles, dredging, and materials disposal. The County of San Diego has established a threshold of 900 MT CO₂e per year as a project-level GHG significance. The GHG emissions from construction and maintenance activities associated with lagoon restoration and materials disposal/reuse for Alternative 2A and Alternative 1B exceed the significance threshold of 900 MT CO₂e per year used for analysis of this project. No mitigation measures are available to reduce emissions to less than significant. Construction and maintenance GHG emissions for Alternative 1A would not exceed the recommended level of significance.

4.3.2 COMPARISON OF ALTERNATIVES

Alternative 2A includes the largest amount of dredging and material removal for lagoon restoration, thus also requiring the largest volume of material disposal. Additionally, Alternative 2A includes the construction of a new Coast Highway 101 bridge and a new inlet and associated

CBFs. These additional activities result in derivative effects such as a higher volume of truck trips, increased areas of disturbance, longer construction durations, and higher noise levels, among others, as compared to the other alternatives. Thus, the degree of adverse impact for Alternative 2A, relative to the other project alternatives that do not include the high volume of dredging or other additional elements, is typically higher for almost all issue areas. Alternative 2A would cause a long-term significant visual impact due to the new inlet/CBFs that would not occur under the other alternatives. Hazardous materials/public safety impacts are considered significant and would require mitigation due to construction of a new inlet under Alternative 2A to reduce impacts to below a level of significance. Construction of a new Coast Highway 101 bridge under Alternative 2A would require mitigation to reduce potential unstable geologic conditions. Ongoing maintenance activities would result in significant air quality impacts with implementation of Alternative 2A. The other project alternatives were found to have less than significant air quality impacts associated with ongoing maintenance. Coast Highway 101 bridge construction under Alternative 2A has the potential for impacts to unknown cultural resources and requires specific CEQA mitigation in addition to mitigation described below for the other alternatives.

Alternative 1B typically has similar impacts to Alternative 2A, except as described above due to additional project elements associated only with Alternative 2A. Alternative 1B proposes removal of 1.2 mcy of material as compared to Alternative 2A, which proposes 1.4 mcy; thus, impacts associated with dredging operations and materials placement are fairly similar for these two alternatives. Alternative 1B would result in a short-term significant unmitigable visual impact during lagoon restoration activities, as would Alternative 2A. This impact would be substantially adverse.

Alternative 1A includes approximately 160,000 cy, which is substantially less dredging than Alternative 2A and Alternative 1B. This reduces the amount and degree of severity of impacts that result from Alternative 1A, relative to the other two alternatives for both lagoon restoration and materials disposal/reuse. Significant and unavoidable short-term noise impacts to sensitive bird species would occur as a result of construction activities under Alternative 2A, Alternative 1B, and Alternative 1A. Alternative 2A would have the most substantial impact as it includes the highest volume of dredging. Alternative 1A would have the least substantial impact due to the relative decrease in volume, footprint, and duration of dredging. Alternative 2A, Alternative 1B, and Alternative 1A require CEQA mitigation for potential water quality impacts from turbidity generated during dredging operations. Alternative 2A, Alternative 1B, and Alternative 1A would result in significant unavoidable adverse air quality impacts during construction. Alternatives 2A and 1B would result in GHG emissions in excess of the 900 MT CO₂e significance threshold. GHG emissions from Alternative 1A would not exceed this threshold. Alternative 2A, Alternative 1B, and Alternative 1A require CEQA mitigation for potential impacts to buried

human remains and inadvertent disturbance of cultural resources. Paleontological impacts could result from grading in sensitive formations and require CEQA mitigation under Alternative 2A, Alternative 1B, and Alternative 1A. Temporary traffic impacts associated with Coast Highway 101 bridge construction or retrofitting would be significant under all three alternatives. Alternative 2A, Alternative 1B, and Alternative 1A would have the potential to create a public health hazard from unknown contamination of dredged/excavated material, though Alternative 1A would have the lowest potential for this impact due to the limited amount of dredging proposed. Alternative 1A would not result in adverse or significant impacts to visual resources but Alternative 2A and Alternative 1B would.

However, the high volume of dredging associated with Alternative 2A and Alternative 1B would also increase the beneficial impacts of the proposed project, such as improved tidal flow and healthier lagoon habitats. With reduced dredging, as proposed under Alternative 1A, the positive impacts, such as increased tidal flow and improved lagoon habitats that are associated with Alternative 2A and Alternative 1B, would not occur to the same degree. Because no onshore material placement would occur, the beneficial impacts associated with the beach nourishment, including reduced risk to coastal structures and a visually enhanced sandy beach, would not occur under Alternative 1A.

The No Project/No Federal Action Alternative would not modify existing conditions and no actions would take place. Thus, no significant environmental impacts would occur from this alternative. However, the lagoon would continue to deteriorate in habitat quality and hydrologic conditions if the SELRP is not completed. While no significant adverse impacts would occur, none of the beneficial or positive impacts that occur with implementation of one of the project alternatives would result under the No Project/No Federal Action Alternative.

The project is a restoration effort and has many proactive design features specifically included to minimize or reduce the potential for adverse effects to result from project implementation. In addition, mitigation has been proposed for substantial adverse impacts or impacts that were identified as significant. In some cases, such as cultural resources, geology and soils, water and aquatic sediment quality, air quality, and hazardous materials and public safety, the proposed mitigation was found to be adequate to reduce the adverse effect and result in less than significant impacts. However, for the resource areas of biological resources; visual (Alternative 2A and Alternative 1B only); traffic, access, and circulation; noise; air quality; and GHG (Alternative 2A and Alternative 1B only), the proposed mitigation would provide for some reduction of impact but would not fully reduce the impact to a level considered less than significant.

4.4 ENVIRONMENTALLY PREFERRED AND SUPERIOR ALTERNATIVE

CEQA

CEQA requires disclosure of the environmentally superior alternative and, if the No Project/No Federal Action Alternative is environmentally superior, identification of a superior alternative among the other alternatives (Section 15126.6[e][2]).

Among the action alternatives (Alternative 2A, Alternative 1B, and Alternative 1A), Alternative 1A would result in the least CEQA significant environmental impacts as shown in Table 4-1. Alternative 1A would not result in the significant and unavoidable visual impact that would result from the other two alternatives. Additionally, Alternative 1A would not have a significant impact on air quality requiring mitigation. Because of the reduced dredging activity, reduced construction time, and least amount of disturbance to the lagoon setting relative to the other alternatives, many of the impacts that would result from Alternative 1A would also be to a lesser degree and extent than those resulting from Alternative 2A and Alternative 1B. However, the beneficial environmental impacts from Alternative 1A would also be less than for the other alternatives, such as reduced improvements to lagoon hydrologic function and drainage patterns, fewer improvements to water quality, fewer enhanced habitat and biological benefits, and no beach material replenishment. As a result of the minimized dredging and reduced benefits, Alternative 1A does not achieve the CEQA project objectives, as listed in Section 1.2, to the fullest extent or to the same level as the other action alternatives. Most specifically, Alternative 1A does not achieve the following objectives: (1) physical restoration of lagoon estuarine hydrologic functions and (2) biological restoration of habitat and species within the lagoon to the same extent as the other alternatives.

NEPA

Section 1505.2(b) of the CEQ Regulations requires NEPA lead agencies to identify the “environmentally preferable alternative” at the time of making a decision on the project. The NEPA purpose of the proposed project is to enhance and restore the physical and biological functions and services of San Elijo Lagoon by increasing hydraulic efficiency in the lagoon, addressing existing water quality impairments, and halting ongoing conversion of unvegetated wetland habitats to support a more connected gradient of balanced habitat types.

Alternative 2A would meet the NEPA purpose of the project as it would increase the tidal prism and result in enhanced lagoon function and high-quality intertidal and transitional habitats. Habitat distributions under Alternative 2A would include an increase in open water areas/tidal channels and mudflat habitat within the lagoon compared to existing conditions. Open water areas

and tidal channels would be increased in all three lagoon basins compared to existing conditions. Mudflat and open water/tidal channels would be actively created throughout the central basin and would replace existing mid-marsh and low-marsh habitat. Similarly, open water/tidal channels and low-marsh would be actively created in the east basin where freshwater/brackish marsh currently exists. This alternative also includes the creation of 12 acres of transitional habitat in the east and central basins. Water quality impairments identified on the Section 303(d) list, including sedimentation and eutrophication, would also be addressed by this alternative through increased hydraulic efficiency and high-nutrient sediment removal. Substantial adverse impacts would result with implementation of this alternative.

Alternative 1B would meet the NEPA purpose of the project as it would create a more connected gradient of balanced habitat types relative to existing conditions through modifications to channels and habitat areas within the lagoon. Alternative 1B would result in an increase in open water/tidal channels, low-marsh, mudflat, and created transitional habitat compared to existing conditions. Most of the increase in open water/tidal channels and mudflat habitat would occur in the central and east basins, and would result in a corresponding decrease in mid-marsh, saltpan, and freshwater/brackish marsh habitats. This alternative includes the creation of 15 acres of transitional habitat in both the east and central basins. Water quality impairments identified on the Section 303(d) list, including sedimentation and eutrophication, would also be addressed by this alternative through increased hydraulic efficiency and high-nutrient sediment removal. Substantial adverse impacts would result with implementation of this alternative.

Alternative 1A would not meet the NEPA project purpose. Although the tidal prism would be slightly increased compared to existing conditions, the CDFW dike would remain in place, with 2 new channels enhancing drainage. Residence times in the east basin and portions of the central basin would remain above 7 days, resulting in limited improvements to circulation. Fluvial flows would remain constricted as they exit the lagoon even with the CDFW channel improvements. This continued hydraulic inefficiency would result in continued sedimentation and substantial periods of high bacteria at the lagoon inlet after storm events, as described in Section 3.4. The majority of high nutrient sediments would remain intact in the lagoon, resulting in continued eutrophication. With implementation of Alternative 1A, the project would result in slightly improved hydrologic function but would not address existing water quality impairments identified on the 303(d) list. Conversion of habitat from unvegetated wetland to vegetated salt marsh occurring under existing conditions would continue to occur, and would not be halted; therefore Alternative 1A would not meet the NEPA purpose.

CHAPTER 5.0

CUMULATIVE IMPACTS

CEQA Guidelines require a discussion of cumulative impacts of a project “when the project’s incremental effect is cumulatively considerable.” (2011 CEQA Guidelines, Section 15130). As defined by Section 15065 (a)(3) “cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (2011 CEQA Guidelines, Section 15065 (a)(3). These cumulative impacts are defined as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts” (CEQA Guidelines Section 15355).

The discussion of cumulative impacts is further guided by CEQA Guidelines Section 15130(a) and (b), which states the following:

- An EIR shall not discuss impacts which do not result in part from the project evaluated in the EIR.
- When the cumulative effect of the project’s incremental contribution and the effect of the other projects is not significant, the EIR shall briefly indicate why and not discuss it further.
- An EIR may identify a significant cumulative effect, but determine that a project’s contribution is less than significant. That conclusion could result if the project is required to implement or fund its fair share of a mitigation measure designed to alleviate the cumulative impact.
- The discussion of cumulative impacts shall reflect the possibility of occurrence and severity of the impacts and focus on cumulative impact to which the identified other projects could contribute.

Federal regulations implementing NEPA also require that the cumulative impacts of a proposed action be assessed. NEPA defines a cumulative impact as an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (40 CFR 1508.7). Additionally, NEPA states that cumulative effects can be the result of individually minor but collectively significant actions which take place over a period of time (40 CFR 1508.7). NEPA also requires a determination of the nature and degree of effect that a proposed discharge will have, both individually and

cumulatively, on the structure and function of the aquatic ecosystem and organisms (40 CFR 230.11(g)).

In general, effects of a particular action or a group of actions would be considered cumulative impacts under the following conditions:

- effects of several actions in a common location,
- effects are not localized (i.e., can contribute to effects of an action in a different location),
- effects on a particular resource are similar in nature (i.e., they affect the same specific element of a resource), and
- effects are long term (short-term impacts tend to dissipate over time and cease to contribute to cumulative impacts).

5.1 DESCRIPTION OF CUMULATIVE ENVIRONMENT

The study area for this cumulative analysis varies somewhat by issue area but for most issues is the north county coast, with a focus on Solana Beach and Encinitas given their proximity, plus key lagoons from Carlsbad to Del Mar. One key exception is air quality, which is addressed at a regional (county-wide) level because standards are set by ARB at this more gross scale (Figure 5-1).

There are six lagoons along northern San Diego County with a long history of human modifications, particularly construction of north-south infrastructure like roads and rail that run perpendicular to each of the lagoon features. Only in the past few decades has the focus been on ecological restoration of those lagoons. The most recent is restoration at San Dieguito Lagoon where planning and implementation occurred between 1997 and 2011. Here, fill was removed to transform upland/farmland acreage to wetland habitat. Restoration of Batiquitos Lagoon was implemented over 15 years ago to create a more tidally open system. The planning efforts at San Elijo Lagoon have been underway for more than 10 years, and planning for enhancement of Buena Vista Lagoon was recently reinitiated. Substantial beach nourishment efforts were associated with restoration at Batiquitos Lagoon (over 1.8 mcy more than 15 years ago) and lagoon functional improvements for infrastructure facilities at Agua Hedionda Lagoon (500,000+ cy).

Additionally, there have been many projects involving materials placement on local beaches along the San Diego region coastline. Several involved placing sand from large- and small-scale maintenance dredging onto nearby beaches. There was also the large-scale 2001 RBSP offshore



Note: Air Quality is addressed at the regional APCD level



No Scale

Figure 5-1
Generalized Cumulative Study Area

dredging effort, which placed 2 mcy of sand along 12 locations from Oceanside to Imperial Beach. The 2012 RBSP placed 1.5 mcy of material on eight receiver sites along this same coastline, including locations within the current project study area. Much smaller replenishment actions have resulted from opportunistic projects from upland coastal development.

Thus, the study area has a long history of project actions (restoration and beach nourishment) at lagoons and along the coast.

5.2 PROJECTS CONSIDERED IN THE CUMULATIVE IMPACTS ANALYSIS

The cumulative projects considered in the following analysis are listed in Table 5-1 and the cumulative study boundary is noted in Figure 5-1. Most of the projects are located along the Encinitas and Solana Beach coastlines; however, key infrastructure projects are slightly inland and parallel to the coast. Key lagoons to the north and south are noted as well because recreational and habitat resources are similar between these lagoons and can be somewhat interchangeable regionally for people and wildlife. If the geographic scope is expanded or narrowed for a specific topic area, it is described in the appropriate section.

Table 5-1 identifies the project name, the jurisdiction within which the action would occur or has occurred, a brief description, and the anticipated schedule for implementation. This list primarily includes planned projects that are on file with local jurisdictions or agencies. Relevant, known projects that have not yet begun the planning process may also be included in this list for the purposes of disclosure, although adequate information may not be available at this time to determine their potential cumulative contribution. Additionally, recently completed projects are also included on the list for informational purposes, even though the environmental effects of a previously completed project would be considered in existing conditions and included in the overall baseline. The city-wide Sand Compatibility and Opportunistic Use Program (SCOUP) efforts are noted for the various cities that have adopted the concept, although total authorized volumes have not yet been placed at any approved receiver site. It is unknown if the full placement amounts would occur given they are based on by-products of other approved projects. However, the few modest sand placements that have occurred via the SCOUP structure are noted under the City of Encinitas. No placement has occurred to date in Solana Beach. Programmatic policy documents (i.e., Coastal Regional Sediment Management Plan, Shoreline Preservation Strategy, General Plan updates) are not included in the cumulative project list, as those are considered strategic planning documents that do not necessarily provide authority for implementation and generally do not identify specific projects. The Storm Damage Reduction Project proposed by the Corps and cities of Solana Beach and Encinitas is noted in Table 5-1. If implemented, the project could occur at a similar time as the SELRP; however, material to be placed at beach sites in Solana Beach and Encinitas by both projects would not be additive.

Table 5-1
Cumulative Projects List – San Elijo Lagoon Restoration

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
Various Jurisdictions				
2012 RBSP	Oceanside, Carlsbad, Encinitas, Del Mar, Solana Beach, San Diego, Imperial Beach	Sand Nourishment	The project involved beach replenishment of the San Diego main's eroding beaches with 1.5 mcy of dredged sediment from three offshore borrow sites. This project involves four main functions: (1) to replenish the littoral cells and receiver sites with suitable beach sand; (2) to provide enhanced recreational opportunities and access at the receiver sites; (3) to enhance the tourism potential of the San Diego region; and (4) to increase protection of public property and infrastructure. Several receiver sites from this 2012 project, and a similar regional project in 2001, are within the cumulative study area. Monitoring of the 2001 RBSP confirmed no long-term significant impacts to beach or offshore resources.	The project was completed in the fall of 2012 and the EIR/EA determined no long-term significant or adverse impacts. Post-construction physical monitoring is underway for 4 years after completion. Monitoring of the 2001 RBSP noted sand volumes at receiver locations were negligible 5 years post-project.
Sand Compatibility and Opportunistic Use Program (SCOUP)	Oceanside, Carlsbad, Encinitas, Solana Beach, Coronado, and Imperial Beach. (See also Encinitas and Solana Beach below for city-specific details.)	Opportunistic Sand Nourishment Program	Implementation of opportunistic sand replenishment program to allow for the processing of multiple beach replenishment projects over a 5-year period as material may become available from other active projects. For each jurisdiction, this program authorizes the issuance of a General Lease – Public Agency Use of Lands in the Pacific Ocean for a term of 5 years, but the start and end dates vary. Details regarding permitted placement volumes and receiver sites are noted in Encinitas and Solana Beach below. The other programs are both too distant (Coronado and Imperial Beach) or have not implemented any actions to date (Oceanside).	Plans approved by local jurisdictions; initially for 5 year terms that expired in 2013. However, City of Carlsbad extended their program until 2016 and Solana Beach for an additional 5 years. Extensions are in process for Oceanside and Encinitas, with the addition of new receiver sites.
One Paseo Project (SCOUP)	Project located in City of San Diego, but possible sand placement in Carlsbad, Encinitas, and/or Solana Beach	Opportunistic Sand Nourishment placement, as by-product of mixed use development	The project is a proposed mixed-use development in Carmel Valley with substantial residential, retail, office, and open space (800,000 to 1,800,000 square feet). It is possible that 300,000 cy of beach sand-compatible material could be hauled to the beach in one or more SCOUP participating cities.	EIR released May 2012; recirculated EIR October 2013. Significant unmitigable impacts to traffic and community character.
I-5 North Coast Corridor Project	San Diego north coast region, from San Diego to Oceanside	Highway Facility Improvements	Caltrans - District 11 proposes improvements to a 27-mile stretch of I-5 in San Diego County. The proposed project begins at La Jolla Village Drive in the City of San Diego and ends at Harbor Boulevard in the City of Oceanside (post mile 28.4/55.4). Currently, I-5 is an eight-lane freeway with some auxiliary lanes that are frequently over capacity and subject to traffic congestion and travel delays. This project proposes four build alternatives to add a combination of features that include High Occupancy Vehicle/Managed Lanes (HOV/ML) that support multiple occupancy vehicle travel, auxiliary lanes to reduce traffic weaving and congestion, a possible additional general purpose lane in each direction of travel, and Direct Access Ramps (DARs) to improve access to the HOV/MLs. The project is expected to be constructed in phases through 2040.	Notice of Preparation (NOP) October 2004 Draft EIR/EIS July 2010. Supplemental Draft EIS/EIR released August 2012. Final EIR/EIS issued October 2013. The PWP/TREP was approved by the California Coastal Commission in August 2014.
			Permitting still ongoing. A Public Works Plan (PWP)/Transportation Restoration Enhancement Program (TREP) has been prepared to identify mitigation and enhancement actions for the entire coastal corridor to mitigate for I-5 and railroad improvements and was approved by the California Coastal Commission in August 2014. These measures may include completion of bicycle and pedestrian connections, improving trails, upgrading new and existing transportation facilities, re-creation of habitat (upland and wetland), plus compensatory mitigation projects that would provide "functional lift" to coastal resources. The PWP/TREP identifies restoration of San Elijo Lagoon and/or Buena Vista Lagoon as opportunities. The stated intent is to improve ecological health and hydrological connectivity as well as enhance critical coastal resources and habitats.	
			Also within San Elijo lagoon, as part of a multi-agency effort to share fiber connections throughout the region, a fiber connection is proposed through the lagoon to connect Caltrans' fiber communications to LOSSAN. It would be an important corridor for Caltrans in the near term because there is not currently a connection through the southern segment of the corridor. In the long term, this connection would provide important redundancy for both Caltrans and NCTD. Currently, the plan would run the conduit through the proposed berm and future pedestrian access of the SELRP to make the connection on the LOSSAN side (Peace 2015).	
Los Angeles to San Diego Rail Corridor Improvements Project (LOSSAN) Rail Corridor Improvements	Throughout San Diego coastal region	Railway infrastructure improvements	During the next 20 years, SANDAG plans to construct nearly \$820 million in improvements in the San Diego County section, including a primary effort to double-track the corridor from Orange County to downtown San Diego. To date, approximately half of the San Diego corridor has been double-tracked. Other infrastructure improvements include bridge and track replacements, new platforms, pedestrian undercrossings, and other safety and operational enhancements. The bridge in San Elijo Lagoon would be double-tracked. The cultural report for the project identified three resources within the	Portions of the project ongoing. Coastal corridor impacts from LOSSAN are also addressed in the PWP/TREP described above for I-5 North Coast Corridor Project. Consistent with state legislation.

5.0 Cumulative Impacts

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
San Elijo Nature Center	County of San Diego	Building Structure	railroad project footprint area of potential effects and concluded that those resources were not eligible for listing in the National Register of Historic Places and no adverse effect to historic properties would result. The two-story facility at the San Elijo Lagoon Ecological Reserve serves as a base for education, land stewardship, and environmental protection. It is constructed of recycled building materials and features solar panels, irrigated roof plants, and recycled water.	improvements to 1-5 bridge crossing and LOSSAN rail bridged in San Elijo lagoon must be performed at the same time. Construction completed 2009.
U.S. Army Corps of Engineers				
Encinitas-Solana Beach Coastal Storm Damage Reduction and Beach Nourishment Project	Encinitas/Solana Beach	Shoreline Protection/Sand Nourishment	The purpose of this project is to effectively reduce risks to public safety and economic damages associated with bluff erosion and to restore beaches along the shorelines of the cities of Encinitas and Solana Beach. The Solana Beach-Encinitas shoreline study area examines two segments: Segment 1 is within the city limits of Encinitas and extends from Daphne Street to H Street; Segment 2 is the majority of the beach within the city limits of Solana Beach, approximately 7,200 feet long extending from the southern city limits north to Tide Park, close to the northern city limits of Solana Beach. The recommended plan is composed of beach nourishment of a 100-foot-wide beach for the City of Encinitas with renourishment cycles every 5 years and a 200-foot-wide beach for the City of Solana Beach with renourishment cycles every 13 years. The recommended plan would result in initial and maintenance placements of sand of 340,000 cy and 220,000 cy, respectively, at Encinitas and 700,000 cy and 290,000, respectively, at Solana Beach. Sand would be dredged from offshore, beyond the depth of closure, using borrow sites designated as SO-5, MB-1, and SO-6. That material would then be placed directly onto the two receiver sites within Encinitas and Solana Beach. Beaches would be replenished periodically over 40-year life span to maintain selected beach width.	EIS/EIR issued in December 2012. Based on alternative chosen, project implementation could occur from 2015 through 2060. The Final EIS/EIR was issued on May 22, 2015, for public review. In April 2015, the Army Corps Civil Works Board approved the Storm Damage Protection Project for construction in 2018 (Meyerhoff 2015). California Coastal Commission approval received on November 14, 2013. Federal funding needed to implement and not available at this time. If material from lagoon restoration were placed on Project receiver sites, then the storm damage reduction project would not place additional sand concurrently. The two projects would not be additive, although given the lack of federal funding, it is highly unlikely the shoreline project would be implemented in the time period of the SELRP.
Encinitas				
Sand Compatibility and Opportunistic Use Program (SCOUP)	Encinitas	Opportunistic Sand Nourishment Program	This city program authorizes deposition of sand adjacent to Batiquitos Beach and Moonlight Beach at an annual maximum of 120,000 cy and 150,000 cy, respectively. Incidental project implemented as described below.	Mitigated Negative Declaration (MND) completed. Approved for period 2010-2015. Permitting and CEQA ongoing to expand program and add two more receiver sites (Leucadia and Cardiff). MND prepared.
Moonlight Beach Sand Replenishment	Encinitas	Annual Sand Nourishment	The City of Encinitas imports sand annually to Moonlight Beach to augment the naturally occurring sand at the beach. This program imports approximately 1,000 cy of sand in the spring from inland sand-borrow areas for placement on the upland portion of the beach. Sand is trucked in, placed in an area above the mean high tide line, and spread across the back beach.	Approved; occurs annually in May since 2000.
Scripps Memorial Hospital – Parking Lot Removal	Encinitas	Development/Opportunistic Sand Nourishment Project	Approximately 5,000 cy of sand was dispersed at intertidal portions of Moonlight Beach from this upland development project, which consisted of the construction of a multi-story parking garage at Scripps Memorial Hospital. This sand placement project was authorized under the City's SCOUP.	Completed March 2010.
Pacific Station	Encinitas	Development/Opportunistic Sand Nourishment Project	Approximately 37,000 cy of sand was placed on Batiquitos Beach as part of the construction of a mixed-use development at 687 South Coast Highway 101, in downtown Encinitas. Export material was generated from a two-story underground parking garage.	Completed 2009.
San Elijo Lagoon Mouth Opening	Encinitas	Maintenance Dredging/Sand Placement	This project excavates sediment from the mouth of San Elijo Lagoon to maintain the opening and places the cobble and sand material south of the mouth on Cardiff Beach. An average of 20,000 cy is bypassed (sand entering lagoon from alongshore transport from north of the inlet is placed on beach south of the inlet) from the lagoon per event.	Opening generally occurs twice annually on an as-needed basis.

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
Encinitas Resorts Hotel	Encinitas	Development/Opportunistic Sand Nourishment Project	This project placed material excavated from a hotel project on the beach at Leucadia.	Completed 2009.
San Elijo Joint Powers Authority (JPA) Recycled Water Expansion Improvement Project	Encinitas	Wastewater Infrastructure	The project created an additional 600 acre-feet per year of new water supply; improved water quality, reliability and operational efficiency of the recycled water produced at the facility; added treatment to allow the facility to accept and treat urban runoff; and created new opportunities to protect coastal water quality. Project improvements included (1) constructing 0.5 mgd of advanced wastewater treatment, (2) converting an existing tank to store recycled water, (3) constructing a new recycled water distribution pumping station, (4) converting existing tanks to store treated wastewater from the Escondido Land Outfall for emergency outfall pressure equalization, and (5) constructing new distribution pipelines to serve additional customers. The original project was modified to include stormwater diversion and microfiltration and reverse osmosis to remove salts so the water could be recycled.	San Elijo JPA approved the project on 12/14/2009. An MND was finalized and the Notice of Determination was dated 2/14/2011. The project is completed.
San Elijo State Beach Replace Lifeguard Headquarters	Encinitas	Parks and Recreation	This project would replace an existing lifeguard headquarters located on a bluff at the southern end of San Elijo State Beach. A replacement lifeguard headquarters facility, consisting of a replacement observation tower and a lifeguard support facility, was proposed in a location that would not be endangered by the bluff erosion but would maintain the current level of visual monitoring for the beach and ocean below and enhance support for lifeguard activities that are currently supplied by other facilities located in Encinitas.	Final MND – no significant environmental effects – 12/28/2006. Awaiting Coastal Development Permit.
Moonlight State Beach Improvement Project	Encinitas	Parks and Recreation	This project includes removing the existing restroom and concession buildings resulting in an increase of beach sand area; adding a combined restroom/concession building totaling approximately 3,600 square feet located at the bottom of the parking lot; and constructing a garage/public overlook building totaling approximately 950 square feet located at the bottom of the C street cul-de-sac. The garage would be used for parking lifeguard trucks, storage containers, and rescue equipment. The top of the garage would serve as a public overlook area.	Construction began fall 2012 and was completed in June 2013.
Moonlight State Beach Lifeguard Tower Construction	Encinitas	Parks and Recreation	Project would replace the existing Moonlight State Beach lifeguard tower with a new facility in the same location. Anticipated plans include 2,200-square-foot structure that would house administration of lifeguard division, first aid station, dispatch station, and workspace for Sheriff's Department. Funding was secured in 2014 for the project.	Environmental documentation process beginning. Construction anticipated in late 2015 or 2016.
Sewer Force Main Replacement	Encinitas	Wastewater Infrastructure	Olivenhain Sewer Force Main Replacement along Manchester Avenue from the San Elijo JPA Water Reclamation Facility to the Olivenhain Sewer Pump Station at the Manchester Avenue/I-5 Interchange. Also, Highway 101 Sewer Force Main replacement at the existing bridge across the San Elijo Lagoon mouth on Highway 101.	Completed 2013.
Olivenhain Trunk Sewer Project	Encinitas	Wastewater Infrastructure	Project involves rehabilitation of or replacement of 54 manholes along the Olivenhain Trunk Sewer, and replacing approximately 2,500 feet of sewer line at the upstream end of the Olivenhain Trunk Sewer and moving it out of Escondido Creek and onto City streets.	Environmental documentation process ongoing. Project completion anticipated 2017.
Solana Beach				
Opportunistic Beach Fill Program (SCOUP)	Solana Beach	Opportunistic Sand Nourishment Program	For Solana Beach, this program authorizes the deposition of sand at Fletcher Cove at an annual maximum of 150,000 cy. No materials placement has occurred or is planned.	Approved for 5-year period 2008–2013. Permits extended for 5 years.
Fletcher Cove Reef Project	Solana Beach	Shoreline Protection	The Corps and the City of Solana Beach are working together to develop the conceptual engineering design for a multipurpose offshore submerged reef located near Fletcher Cove. The primary goal of the reef would be to retain sand to create a wider beach and improve the efficacy of beach nourishment projects.	Conceptual engineering and design completed; Phase II engineering design and environmental review not initiated.
Gateway Park	Solana Beach	Park and Recreation	Purchase of a 3.44-acre parcel, known as the Gateway Property, on the east side of Scenic Highway 101 at the north end of Solana Beach across the highway from Cardiff State Beach for preservation and incorporation in the San Elijo Lagoon Ecological Reserve.	In December 2011, San Elijo Lagoon Conservancy purchased the Gateway Property. Ongoing fundraising for park development.
Fletcher Cove Community Center	Solana Beach	Development	This project includes full refurbishment and accessibility improvements to the existing community center located on a 1-acre site above Fletcher Cove Park.	Construction started 2010; project completed in 2012.
Highway 101 Westside Improvement Project	Solana Beach	Pedestrian/Bicycle Circulation	This project is a pedestrian and bicycle circulation improvement project to promote traffic calming, safe pedestrian mobility, and business vitality in the Highway 101 corridor in Solana Beach. Highway 101 would remain a four-lane roadway after completion of these improvements. The project's extents are between Dahlia Drive and Cliff Street.	Completed in 2013.
Lagoon Restoration Projects				
Buena Vista Lagoon Enhancement Project	Oceanside, Carlsbad	Lagoon Enhancement	Conservation efforts have been ongoing since the 1980s. The Buena Vista Lagoon Enhancement Project (previously referred to as the Buena Vista Lagoon Restoration Project) would enhance approximately 200 acres of wetland habitat at the lagoon. Project goals include: - Create a self-sustaining ecosystem to ensure long-term environmental viability, while incorporating a manageable amount of monitoring and maintenance; - Create a functional ecosystem for nesting, wintering, and year-round foraging of native, migratory, and special-status species; - Maintain existing sensitive habitats and native species diversity while attracting as many naturally occurring species as can be reasonably sustained;	Ongoing enhancement planning; NOP issued May 2014. Draft CEQA document not yet issued. Alternatives identified in the NOP included freshwater system, salt water system and hybrid system. Enhancement of this lagoon is one of two options identified in the I-5 North Coast Corridor PWP/TREP.

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
Batiquitos Lagoon Restoration Project	Carlsbad	Lagoon Restoration	- Create conditions that curtail the growth and expansion of exotic species; and - Incorporate appropriate and compatible public uses such as viewing sites, trails, and signage. SANDAG is serving as the lead agency in current Buena Vista Lagoon enhancement planning efforts. In 1987, the Port of Los Angeles, City of Carlsbad, U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Wildlife (CDFW), and State Lands Commission signed an agreement toward implementing the restoration of Batiquitos Lagoon. The restoration would serve as mitigation for loss of marine resources in the Outer Los Angeles harbor due to Port construction activities. Restoration began in March 1994 and, in December 1996, the restoration was completed when the mouth of the lagoon was opened to reestablish continuous tidal flushing. A long-term monitoring program was required for 10 years following the construction period. CDFW manages the lagoon using maintenance funds provided by the Port of Los Angeles.	Complete, restoration began in March 1994 and continued through December 1996.
Batiquitos Lagoon Ongoing Dredging	California Department of Fish and Wildlife	Lagoon Maintenance	CDFW maintains Batiquitos Lagoon through an ongoing dredging program to remove sediment and open the inlet, approximately every 3 years.	Ongoing. Dredging took place in late 2011 through early 2012.
San Dieguito Lagoon Restoration Project	Del Mar	Lagoon Restoration	The San Dieguito Wetlands Restoration Project revitalized 150 acres of coastal wetlands, creating a fish nursery and a refuge for migratory water fowl and endangered species. The project restored tidal flows, natural habitat, and vegetation. Further restoration activities, referred to as the San Dieguito Lagoon W-19 Restoration Project (NOP released 8/27/14), have been proposed by Caltrans/SANDAG as mitigation for the North Coast Corridor and the El Camino Real Bridge projects. The proposed project will create more than 50 acres of salt marsh and more than 15 acres of freshwater marsh suitable for light-footed Ridgway's rail.	Completed in 2011, being monitoring for 40 years. Grading refinements implemented in 2014 to reduce elevations west of I-5 and improve wetland function. Additional restoration activities, referred to as the San Dieguito Lagoon W-19 Restoration Project, are expected to begin construction in 2017.

Beach quality material generated by the SELRP would be transferred to the Corps and cities for placement as part of the Storm Damage Reduction Project. They would then reduce the quantity of beach quality material to be dredged and transported to those same sites. The total volume of material would be consistent with the Storm Damage Reduction Project. Impacts associated with placement of material at the proposed Storm Damage Reduction Project sites are addressed in the CEQA/NEPA document prepared for that project.

5.3 CUMULATIVE IMPACT ANALYSIS

To ensure a conservative analysis that accurately reflects “worst-case” cumulative impacts, impacts from all three of the alternatives for the SELRP were considered for potential contributions to cumulative impacts. Differences between alternatives in terms of contribution to cumulative impacts are called out when applicable; otherwise, the impacts are assumed the same across all alternatives.

5.3.1 LAND USE/RECREATION

Section 3.1 identifies no significant land use impacts as a result of activities associated with lagoon restoration or materials disposal/reuse for any of the proposed alternatives as the majority of the project study area would generally maintain its current land use; would not create incompatible land uses; and would not be inconsistent with regulatory policies. Many of the projects on the cumulative project list involve sand nourishment and beach replenishment projects that would also not create land use conflicts as they would be placing sand onto existing beach areas and would not substantially modify the land use of an area or create a new incompatible use. Additionally, many land use plans encourage beach replenishment. Other cumulative projects, such as infrastructure improvements, are not generally of the nature to result in significant land use conflicts or incompatibilities and would improve or upgrade existing infrastructure such as I-5 or the railway corridor. Cumulative projects within the lagoon area would not conflict with coastal access policies as the I-5 North Coast Corridor Project includes trail enhancements and there is currently no pedestrian access for crossing the railroad within the lagoon that could be impacted by the LOSSAN double-tracking project.

For these reasons, the project would not make a cumulatively considerable contribution to a direct or indirect adverse significant cumulative impact related to land use. A less than significant cumulative impact would occur.

Beach nourishment projects on the cumulative list might result in temporary recreational impacts to surfing, beach-going, and other water sports due to restricted areas or access for safety purposes while material is physically placed on the beach areas. However, these recreational

impacts would be short term and the overall result would include improved recreational opportunities due to the increased volume of sand and available beach area. The sand nourishment projects have varying implementation timeframes and would not all occur at the same time, leaving ample local beach recreation areas available while project-related restrictions may be in place at other locations.

Some cumulative projects would also serve to enhance the recreational opportunities and value of the lagoon and immediately surrounding areas. As part of the I-5 North Coast Corridor Project, Caltrans would construct an enhanced trail connection on the west side of the widened I-5 bridge over San Elijo Lagoon consisting of a suspended pedestrian walkway structure. It would complement and connect the existing trail system in the lagoon. Additionally, the Final I-5 North Coast Corridor EIR/EIS states in the land use section that access to existing trailheads and designated trails in the Reserve would be unaffected (Caltrans 2013). Further, the coastal access enhancements defined in the PWP/TREP would be implemented if the I-5 North Coast Corridor and LOSSAN projects are permitted and constructed. While there may be short-term closures/changes to individual trails, specific beach access points, or temporary road closures or detours requiring modified recreation access, the overall recreation opportunities will be increased. The proposed Gateway Park project adjacent to the south of the lagoon could provide new trails, sitting areas, and a vantage point for wildlife watching. Alternative 1B of the SELRP would also allow for an additional trail within the central basin to complete the existing trail loop between the Nature Center and NCTD access road. Additionally, two cumulative projects at local beaches, San Elijo State Beach and Moonlight State Beach, would replace lifeguard facilities and improve beach amenities.

For these reasons, the temporary restrictions and interruptions to recreational opportunities that would result from the proposed project would not make a cumulatively considerable contribution to a direct or indirect adverse significant cumulative impact related to recreation. Long-term beneficial impacts would result from the proposed project and other cumulative projects. A less than significant cumulative impact would result.

5.3.2 HYDROLOGY

While Section 3.2 identifies an increase in potential flood levels as a result of the project, less than significant permanent or temporary adverse impacts to hydrology would result from implementation of any of the project alternatives. The proposed project would substantially change some of the lagoon's hydrology and tributary drainage patterns (varying in degree by alternative); however, the design-induced changes would cause a net beneficial impact to the hydrology by improving overall circulation with, and improved drainage pathways to, the ocean.

It is possible that other cumulative projects, specifically projects that require substantial earth-moving or surface alterations, or projects that increase impervious surface area such as the I-5 North Coast Corridor Project, could also change and modify local hydrology. However, other cumulative projects would be required to adhere to all federal, state, and local regulatory requirements, and may include preparation of a SWPPP and implementation of BMPs to minimize impacts on surface drainage patterns, the amount of surface runoff, and the exposure of people or property to water-related hazards such as flooding. These regulations and requirements would further aid in minimizing the potential for project impacts that could combine to create cumulative hydrology impacts.

For these reasons, the project would not make a cumulatively considerable contribution to a direct or indirect adverse significant cumulative impact related to hydrology. Long-term beneficial hydrological effects would result in the cumulative scenario. A less than significant cumulative impact would occur.

5.3.3 OCEANOGRAPHY/COASTAL PROCESSES

Project analysis found that less than significant impacts would result from any of the alternatives to littoral processes, sand erosion rates, risk of damage to coastal structures, and coastal wetlands during either the lagoon restoration process or the materials disposal/reuse. Additionally, for Alternative 2A and Alternative 1B, beneficial impacts would result due to onshore materials placement because of reduced risks of damage to coastal structures.

The majority of cumulative projects that would not include sand nourishment activities or other types of onshore or offshore materials removal or placement would not have any effect on coastal processes. However, multiple projects on the cumulative list are sand nourishment projects. The materials deposited on the neighboring beaches from other beach nourishment projects would add sand to the littoral cell in the vicinity of the project area, which could impact littoral processes. However, these sand nourishment projects are generally undertaken to bypass sand that has been temporarily removed from the littoral cell and trapped in locations such as within Oceanside Harbor or the various coastal lagoons. The replenishment of beach sand from the bypass projects can be considered as a cyclic redistribution of sand within the littoral cell and is not anticipated to result in adverse effects to littoral and coastal processes. Larger projects, such as the 2001 and 2012 RBSPs, supply the system because there is no longer an adequate supply of sediment from historic sources (upstream erosion, bluff erosion, etc.). Sand supplies from larger projects eventually distribute throughout the system and exit to canyons and outside depths of closure such that no long-term adverse cumulative effects occur. Additionally, cumulative sand nourishment projects throughout the region would not substantially reduce the 30-mcy deficit identified for the region (SANDAG 2011). Similar to the discussion of the

proposed project, onshore beach nourishment resulting from cumulative projects would be beneficial in reducing risks from wave and storm erosion to coastal geology and structures.

For these reasons, the proposed project would not make a cumulatively considerable contribution to a cumulatively significant direct or indirect adverse impact related to coastal processes under any alternative. Some beneficial impacts would result from the onshore material placement as part of the proposed project and other cumulative beach nourishment projects specific to increased protection of coastal geology and structures. A less than significant cumulative impact would result.

5.3.4 WATER AND AQUATIC SEDIMENT QUALITY

As detailed in Section 3.4, the proposed project or alternatives would not create significant impacts to water or sediment quality because a variety of appropriate BMPs would protect water quality, minimize erosion, and minimize sediment transport during construction. Turbidity plumes may result from materials placement in offshore and nearshore locations, but would settle quickly. However, the potential water quality impacts associated with temporary turbidity due to dredging activities are considered potentially significant as the lagoon is a 303d listed water body. Mitigation, project design features, and regulatory requirements would serve to minimize potential turbidity effects. The proposed project and alternatives would provide a long-term water quality improvement (to varying degrees dependent on alternative) throughout the lagoon by increasing tidal exchange, which would improve lagoon circulation, decrease stagnation, and increase lagoon and coastal water quality. Beneficial improvements have already occurred at San Dieguito Lagoon and may occur at Buena Vista Lagoon if enhancement proceeds.

Water quality and hydrology impacts can have widespread effects to an entire watershed, hydrologic unit, and downstream locations. For this reason, analysis of potential cumulative impacts to water quality must also consider development and projects that are occurring at upstream locations in the watershed. Many of the projects on the cumulative project list, such as beach nourishment and other smaller projects, would not be of the type or magnitude to create significant water quality impacts. Some projects, such as the Olivenhain Trunk Sewer Project, would make improvements to existing infrastructure to minimize the potential for local wastewater spills to affect lagoon water quality. However, larger projects, such as the I-5 North Coast Corridor project, LOSSAN project, or other large developments within the watershed, could result in degraded water quality. As described in Section 3.4, multiple federal, state, and local regulations must be complied with to protect water quality. Typically, projects under the Construction General Permit would be required to prepare a SWPPP that identifies BMPs that would be used to prevent pollutant discharge and minimize other water quality impacts. Additionally, projects would be implemented in accordance with RWQCB water quality

certifications, which require compliance with applicable water quality standards, limitations, and restrictions. The required adherence to water quality regulations and implementation of required BMPs would minimize the potential for water quality impacts to result from cumulative projects and development throughout the watershed.

Turbidity plumes associated with materials placement under Alternative 2A or Alternative 1B would not be expected to overlap with other areas of turbidity caused by cumulative sand nourishment projects. The proposed project turbidity plumes would be temporary, settle quickly, and be fairly localized. It is unlikely that cumulative sand nourishment projects that create temporary nearshore turbidity would be ongoing in the immediate vicinity at the same time as the proposed project and would be subject to dispersion and dilution by ambient currents, wind, and wave action.

For these reasons, the proposed project would not make a cumulatively considerable contribution to a direct or indirect cumulatively significant adverse impact related to water quality under any alternative. Some beneficial impacts would result to water quality (most substantially under Alternative 2A) due to increased circulation and tidal exchange. A less than significant cumulative impact would result.

5.3.5 GEOLOGY/SOILS

Project removal and or placement of sediment and other material from the generally flat lagoon basins or the previously disturbed access roads and staging areas would not occur in locations that provide stability for other natural features, such as slopes or hillsides, and would not create increased geologic hazards as described in Section 3.5 for any of the alternatives.

Offshore and nearshore placement of materials is considered to have no geologic or soils impacts. The placement of sand at onshore locations (Alternative 2A and Alternative 1B) would not cause geologic hazards and may actually reduce the potential for geologic hazards as it would serve to protect against the undercutting or erosion of cliffs or other areas subject to wave-induced erosion, thus resulting in the beneficial outcome of reducing slope instability and landslide potential. There would be positive geologic results for the cumulative sand nourishment projects included on the cumulative list.

Construction of a new Coast Highway 101 bridge would potentially occur within soil types subject to liquefaction, erosion, settlement, or other unstable geologic conditions, and would require mitigation including geotechnical investigations and implementation of site-specific measures recommended in the engineering study to ensure appropriate design for structural stability and reducing unstable geologic conditions. The channel under the new I-5 bridge

planned by Caltrans would require substantial deepening for improved hydraulics, and a new railroad bridge structure would be constructed by NCTD with a channel extending beneath it as part of the LOSSAN double-tracking project. Multiple regulatory codes and requirements would apply to ensure structures are properly designed and engineered to achieve high safety standards when being constructed in unstable geologic conditions. Similar to the SELRP, the implementing agencies for these bridge projects would be required to perform necessary geologic investigations and meet engineering and design requirements to ensure appropriate design for geologic safety. Adhering to regulations and requirements aid in minimizing the potential for project impacts that could combine to create cumulative geologic and soils impacts.

For these reasons, the activities associated with lagoon restoration and materials placement under any of the alternatives would not increase geologic hazards. **Thus, the proposed project would not make a cumulatively considerable contribution to a cumulatively significant adverse impact related to geology and soils. A less than significant cumulative impact would result.**

5.3.6 BIOLOGICAL RESOURCES

Because the biological resources specific to the lagoon are unique and specialized, lagoon restoration is discussed under a separate heading from the on-site materials placement sites.

Lagoon Restoration

A limited number of lagoon resources are located throughout the San Diego coastline, including Buena Vista, Agua Hedionda, Batiquitos, San Elijo, San Dieguito, and Los Peñasquitos lagoons. Because lagoon resources are specific to specialized conditions of each lagoon, the cumulative analysis for this project focuses on projects that might have the potential to impact biological resources also associated with San Elijo Lagoon.

As described in Section 3.6, restoration construction would result in greater than 50 percent temporal loss of sensitive habitats that would be significantly impacted by construction activities, including coastal salt marsh (low- and mid-), open water, saltpan/open water, and tidal mudflats and is considered a short-term significant and adverse direct impact to these types of habitats. Because the SELRP would closely coincide with other cumulative projects occurring within the lagoon area, such as the I-5 North Coast Corridor and LOSSAN double-tracking projects, sensitive lagoon habitats could be further impacted. **This is considered a short-term significant and adverse cumulative impact.** However, the temporary loss of the habitat within the lagoon is unmitigable as it must occur for the restoration activities to take place. As detailed in Section 3.6.4, additional mitigation measures to lessen impacts were considered but found to be infeasible at the project level and there are also no additional feasible mitigation measures

available to lessen the cumulative impact. It is not possible to further reduce biological impacts through timing or phasing considerations with other in-lagoon cumulative projects due to requirements for concurrent construction as mandated by the Kehoe Bill. The potential for receiving recovery after all three are constructed is greater given the simultaneous construction, shortening the overall duration. This short-term cumulative impact would cease over time as the habitats are restored and beneficial habitat impacts would result from the enhanced and restored lagoon function.

The San Dieguito and Buena Vista lagoon restoration projects have the potential, when considered cumulatively with the SELRP, to result in temporary cumulative habitat losses should the project schedules overlap. Of issue is the loss of foraging, nesting or over-wintering habitat as part of the relatively limited coastal wetlands in southern California. Long-term, all three projects could serve to improve the ecology (functions and values) of these critical lagoon resources. When considering the potential for short-term impacts, it is important to consider the timing, along with the resources.

The San Dieguito project completed restoration in 2011, but in early 2014, a portion of the site was re-graded as part of the on-going adaptive management plan for the project. The Project created/restored salt marsh, mudflat, subtidal and upland habitats, and fisheries resources, on what was most recently farmed and upland habitat. It created more than 100 acres of coastal wetlands that is already functioning for the intended fish resources, and many birds as well. While vegetation at San Dieguito will likely not be fully established prior to the SELRP implementation, habitat will already be of higher biological resource value than the pre-project condition and will be available for migratory birds seeking stop-over habitats. Therefore, no cumulative temporal impacts are anticipated when considered with this project.

There is no known implementation date for Buena Vista Lagoon restoration. Funding restrictions make it unlikely that project construction would overlap with the SELRP. It is possible that any restoration activities at Buena Vista Lagoon could occur after SELRP installation but during the subsequent maintenance and monitoring period. Buena Vista Lagoon currently consists of predominantly freshwater and open water habitats, and although several alternatives are being considered for the restoration project (freshwater, saltwater, and hybrid), Buena Vista Lagoon currently supports a different habitat mix than those that would be impacted by the SELRP. San Elijo Lagoon does support freshwater habitats in the east basin; however, project construction would affect a limited amount of freshwater habitats areas relative to the entire lagoon, consisting predominantly of brackish marsh. After full tidal opening at San Elijo Lagoon, it is possible that increased tidal flow may result in the conversion of additional habitat away from freshwater/brackish marsh. However, this is anticipated to be limited to the transitional monitoring area above the restored high water elevation.

If Buena Vista Lagoon is restored to a saltwater habitat mix, a reduction in freshwater habitats would result. However, the limited transition of freshwater habitat at San Elijo Lagoon would not be cumulatively considerable when considered with the restoration of Buena Vista Lagoon, for the following reasons: (1) Conversion of one habitat type to another is not in itself a significant biological impact, as the restoration of degraded habitat (regardless of type) would be ecologically beneficial to sensitive species and the lagoon ecosystem as a whole. (2) Saltwater habitats that would be created at San Elijo Lagoon are regionally far more limited than freshwater marsh habitats (3) Sensitive species relying on freshwater habitats within San Elijo Lagoon are not expected to be significantly impacted by the transition (e.g., light-footed Ridgway's rail currently living in the east basin is expected to transition to newly restored low marsh habitats). (4) Habitat impacts at San Elijo Lagoon would be limited in acreage, and the majority of freshwater wetland habitats at San Elijo Lagoon would remain available for resident and migratory species. Therefore, no cumulative significant impacts are anticipated.

Belding's savannah sparrow is a year-round resident of the lagoon and would experience temporary loss of greater than 50 percent of their nesting habitat. This sensitive bird species has the potential to be further disturbed or impacted by other cumulative projects such as the I-5 North Coast Corridor and LOSSAN double-tracking projects taking place in the lagoon or near the lagoon, such as the Olivenhain Trunk Sewer Project, within a similar timeframe. It is likely that those cumulative projects would not impact habitat at the same magnitude as the SELRP as they would be generally more localized, **but the cumulative impacts to Belding's savannah sparrow would be significant and adverse in the short term.** As detailed in Section 3.6.4, additional mitigation measures to lessen impacts were considered but found to be infeasible at the project level and there is also no feasible mitigation at the cumulative level available to reduce this cumulative impact as the loss of nesting habitat must occur for project implementation to take place within the lagoon.

The proposed project results in the potential for short-term noise impacts to sensitive species as a result of construction activities. When in proximity to wildlife, the effects of dredge and other construction noise may disrupt foraging or breeding behavior of sensitive birds. The dredge is slow and would be operating in one basin at a time; as such, birds could always relocate to quieter habitat. However, relocation during the breeding season is not feasible for nesting birds and this is considered a significant and unavoidable impact. If the I-5 North Coast Corridor Project or LOSSAN double-tracking project were to occur simultaneously and in proximity to the active dredging footprint, it is possible that ambient noise levels would increase to even higher levels. The lagoon restoration dredging activities would play a substantial role in these increased noise levels.

Multiple mitigation options were considered to reduce noise levels that may impact nesting birds during breeding seasons; however, none were found feasible. The use of an electric dredge was considered but eliminated as a noneffective option as the noise levels from an electric dredge compared to diesel dredge do not substantially differ. The use of noise walls was also eliminated as a feasible mitigation option for reasons including habitat concerns that would result from the long-term placement of a noise wall and the substantial length of the noise wall that would be required because the dredge would be moving. A mitigation measure limiting work to outside the breeding season was also considered. However, this would extend the overall construction duration from 2 years to 4 years, prolong the overall period of disruption to foraging birds to 4 years, and add at least 2 years for habitat recovery. This was determined to be biologically undesirable and therefore infeasible. **For this reason, implementation of any project alternative, with the exception of the No Project/No Federal Action Alternative, could make a cumulatively considerable contribution to an adverse temporary significant cumulative biological impact due to noise effects on sensitive birds.** As detailed above and in Section 3.6.4, mitigation measures were considered but found to be infeasible at the project level and no additional feasible cumulative mitigation measures beyond those described above have been identified to reduce cumulative noise impacts.

Multiple cumulative projects that could also include construction are located within the lagoon itself and therefore have the potential to adversely impact sensitive biological resources. Adverse biological impacts resulting from cumulative projects could include the disturbance of sensitive vegetation communities, habitat loss, impacts to nesting and/or foraging habitat of sensitive animal species, restrictions to wildlife movement, degraded water quality, and others. These projects would be subject to all federal, state, and local regulations regarding the avoidance, protection, and mitigation of adverse impacts to biological resources. While some similar adverse short-term biological impacts would occur with the proposed lagoon restoration, they are not considered to combine with other cumulative projects to create a significant adverse impact because they would cease over time as habitats establish. In addition, the SELRP would not have a considerable contribution to long-term cumulative impacts because of the overall positive beneficial biological results that would occur from the construction of this proposed project. The proposed project would result in improved hydrologic function, increased foraging habitat, and reversal of the rapid habitat changes occurring under existing conditions. The addition of cumulative projects and their potentially adverse impacts on biological resources would not reduce the proposed project's ability to create improved lagoon ecology, or increase foraging for species, and would result in no overall loss of lagoon resources. The SELRP is, by design, a project for the long-term improvement of water quality and health/diversity of biological resources. **For these reasons, the proposed project would not make a cumulatively considerable contribution to a long-term direct or indirect cumulatively significant adverse**

impact related to the overall loss of biological resources. A less than significant cumulative impact would result.

Materials Disposal/Reuse

There are no known cumulative projects proposing offshore disposal, and disposal at LA-5 is limited to a specific volume controlled by EPA; thus, that topic is not discussed further. As noted in the list of cumulative projects, multiple beach placement/nourishment projects could occur along the San Diego coastline and at overlapping onshore locations as proposed by the SELRP. Of the listed cumulative projects, only those involving beach placement/nourishment or associated with the ocean environment have the potential to contribute to cumulative impacts to nearshore and offshore biological resources. It is not reasonable to assume that onshore materials placement would occur simultaneously in areas of immediate proximity, but rather would be coordinated and occur at separated locations along the coast. The Encinitas-Solana Beach Coastal Storm Damage Reduction Project is anticipated to be implemented in 2015; however it identifies the possibility that materials from the SELRP may be substituted or supplement sand for beach nourishment proposed as part of that project rather than being an additional volume of material placed in the system (Corps 2012). Volumes placed as part of the SELRP would therefore not be considered cumulatively with that project. Additionally, marine impacts from onshore or nearshore material placement are typically temporary and localized, and dissipate rapidly with ambient conditions returning quickly. The largest of past sand nourishment projects, the 2012 RBSP, was completed and is in the monitoring phase. Thus, the potential for many cumulative adverse impacts, such as increased turbidity, aquatic wildlife displacement, and other potential biological impacts, would likely not combine as these impacts would have ceased prior to implementation of the SELRP. Other cumulative beach nourishment projects are of a much lesser volume, resulting in even lesser potential for impacts to combine in a cumulative manner. These projects would also be subject to all federal, state, and local regulations regarding the avoidance, protection, and mitigation of biological resources. Environmental documents, such as those for the 2012 RBSP and the Encinitas-Solana Beach Coastal Storm Damage Reduction Project, found that no significant cumulative biological impacts were anticipated from the projects. Overall, Alternative 2A or Alternative 1B, in combination with cumulative beach nourishment projects, would enhance sandy beach habitat to the benefit of numerous species. The potential for cumulative impacts to sensitive nearshore habitat areas due to increased material in the coastal process is anticipated to be less than significant based on project model predictions. **For these reasons, Alternative 2A or Alternative 1B of the proposed project would not make a cumulatively considerable contribution to a direct or indirect significant adverse cumulative biological impact during onshore or nearshore materials placement. A less than significant cumulative impact would result.**

5.3.7 CULTURAL RESOURCES

Section 3.7 identifies potential significant CEQA impacts to cultural resources under Alternative 2A because the bridge/inlet areas of excavation would be in locations with the possibility for buried unknown cultural resources to be present, and because of the known presence of previously recorded cultural resources in the immediate proximity to the lagoon study area. CEQA mitigation is proposed that would provide for the identification and monitoring of areas with the potential to contain intact cultural resource deposits, and, if necessary, the recovery, curation, and documentation of any resources identified on a DPR form and in CEQA/NEPA technical report. Mitigation and regulatory requirements would require that work be suspended or redirected if human remains were encountered and would also include consultation with local Native American Tribes per CEQA and Section 106 and a protocol for handling the inadvertent discovery of human remains. In accordance with Corps special conditions, all work in the area of the resource would stop until the necessary consultations are completed. Work could then be reinitiated. This would ensure that any cultural resources encountered during construction would be treated in accordance with applicable regulations and guidance. If excavations became necessary because impacts to sites could not be avoided, then permanent curation of the remains would ensure that the important information was retained and documented. Additionally, Alternative 2A, Alternative 1B, and Alternative 1A could result in potential accidental disturbance to nearby cultural resources during construction use of an existing access road. Mitigation was included to require the use of exclusionary fencing to avoid inadvertent disturbance of cultural resources in proximity to the APE, staging areas, and access roads. The proposed mitigation measures would minimize/mitigate the potential for the project to add to the cumulative loss or destruction of significant cultural resources.

Other cumulative projects that involve ground-disturbance would also have the potential to impact buried cultural resources. Similar to the proposed project, these cumulative projects would also be subject to all federal, state, and local regulations mandating the protection of cultural resources. If cumulative projects identify a potential to impact cultural resources, the impact would typically be mitigated through measures such as site preservation or data recovery. These types of mitigation measures allow the cultural resources data to be protected and preserved to ensure that the critical information necessary to the future study of cultural resource sites and artifacts is not lost or destroyed by the proposed project or other cumulative projects within the study area.

Because the proposed project and cumulative projects must comply with CEQA; NEPA; and all other cultural federal, state, and local regulations, which require adequate analysis and appropriate mitigation of cultural resource impacts, the cumulative impacts to archaeological resources would be expected to be fully avoided, minimized, or mitigated through a variety of

methods including those described above, and critical information regarding regional prehistory preserved and/or documented. While the entire 935-mile route of Highway 101 in California was given historic designation by the state in 1998 and is well over 50 years old, it has been widened and improved many times within the proposed project area and has a low potential to be eligible for listing in the NRHP or CRHR due to loss of integrity. Thus, the overall historic value of this roadway would not be substantially diminished due to the new bridge construction associated with Alternative 2A.

For these reasons, any alternative of the proposed project would not make a cumulatively considerable contribution to direct or indirect adverse cumulative impacts for cultural resources. A less than significant cumulative impact would result.

5.3.8 PALEONTOLOGICAL RESOURCES

As described in Section 3.8, most components of the alternatives would not require excavation that could extend to a depth that may damage or destroy paleontological resources found in highly sensitive underlying bedrock formations. However, the proposed access road along the southern boundary of the lagoon could extend into areas underlain by the highly sensitive Delmar Formation that occurs at or near the surface in the area, so excavation of any depth may have the potential to impact paleontological resources. Thus, per CEQA, these shallow grading activities may disturb the underlying sensitive formation, resulting in a potential for paleontological resources to be damaged or destroyed. Required CEQA mitigation would include monitoring during grading, trenching, or other excavation into undisturbed rock and sediment layers beneath the soil horizons with a fossil recovery program and Paleontological Resource Mitigation Report. This would ensure that any paleontological resources encountered during construction would be adequately treated and the important information retained and documented. This would minimize/mitigate the potential for the project to add to the cumulative loss or destruction of significant paleontological resources. Placement of materials on either the ocean floor or beach areas would also not impact paleontological resources found in underlying parent material. **The alternatives would not make a cumulatively considerable contribution to a cumulatively significant direct or indirect adverse impact related to paleontology. A less than significant cumulative impact would result.**

5.3.9 VISUAL RESOURCES

Section 3.9 identified temporary significant impacts as a result of construction activities under Alternative 2A and Alternative 1B because the visual character of the project site would change substantially from existing conditions due to vegetation removal from a large portion of the central basin, substantial landform alteration, construction equipment in atypical locations, and

some outdoor lighting. Additionally, a long-term visual impact associated with the inlet/CBF under Alternative 2A is considered significant and unavoidable. The new inlet and CBFs would introduce a highly visible man-made, linear feature perpendicular to Highway 101 and the contrast to the current beach character would be strong for highly sensitive beach users.

When analyzing cumulative visual impacts, it is important to consider those projects that could alter the existing visual environment with the same viewshed as the project. Other cumulative projects, such as the I-5 North Coast Corridor and LOSSAN double-tracking projects could add to the short-term temporary construction visual impacts within the lagoon. These other cumulative projects could contribute to the short-term visual impact by adding more construction equipment operating in the area, increasing vegetation removal, landform modifications, stockpiling, and other construction-related activities. As detailed in Section 3.9, mitigation measures, such as screening of staging areas, are available to reduce visual impacts of construction; however, due to the expansive nature of construction throughout the lagoon basin and surrounding areas, mitigation is not feasible to fully minimize the visual impacts of construction activities throughout the natural lagoon setting. These visual intrusions would last only for the duration of each project's construction period and, ultimately, the lagoon character would be returned similar to existing preconstruction conditions. The increase in habitat diversity may be even more interesting and appealing and would enhance the aesthetic effect for trail users and visitors at the Nature Center. **However, in the short term, Alternative 2A and Alternative 1B would make a cumulatively considerable contribution to a significant cumulative visual impact due to the cumulative construction projects throughout the lagoon.** As described in Section 3.9.4, at a project level there is no additional feasible mitigation that could further reduce visual impacts. There are also no additional feasible mitigation measures beyond those described above that have been identified to further reduce the cumulative visual impact.

Potential beach placement locations all have various sensitive viewers, ranging from beachgoers, residences, recreationalists, and others. Construction equipment would be temporarily visible during materials placement, typically 2 to 4 weeks and no more than 60 days. Additionally, construction equipment would be mobile and not located in one area for a long period of time as the work progresses along the shore. All potential onshore placement locations have been recipients of beach nourishment in the past and the visual occurrence of construction equipment on these beaches is not highly uncommon. Because few projects can actually be constructed on the sandy beach areas, a limited potential exists for construction of other cumulative projects to occur simultaneously in the vicinity of the materials placement operations. **Because of the short-term and continuous mobile nature of the operations, the materials placement activities would not make a cumulatively considerable contribution to a significant cumulative visual impact. A less than significant cumulative visual impact would result.**

Many of the cumulative projects in the project viewshed would have long-term positive aesthetic outcomes. For example, other cumulative beach nourishment projects typically result in positive overall visual impacts as they enhance the sandy beach aesthetic through the creation of additional sand to cover and supplement the existing beach environment. Large projects such as the I-5 North Coast Corridor project and LOSSAN rail improvements project may slightly change the look of the existing transportation facilities, but would likely not introduce substantial new modifications to the existing visual environment. For these reasons, the adverse visual change that would result from the new inlet and CBFs associated with Alternative 2A is fairly isolated and would not combine with other adverse visual impacts in the immediate area to create a significant direct or indirect adverse cumulative impact to visual resources. **In the long term, Alternative 2A, Alternative 1B, and Alternative 1A would not make a cumulatively considerable contribution to a significant cumulative visual impact due to the cumulative construction projects throughout the lagoon. A less than significant adverse cumulative visual impact would result.**

5.3.10 TRAFFIC, ACCESS, AND CIRCULATION

As outlined in Section 3.10, no long-term significant traffic impacts would result from the any of the project alternatives as the proposed project would not result in permanent generation of trips that could increase traffic volumes. However, a significant traffic impact would occur during bridge construction under Alternative 2A and bridge retrofitting activities under Alternative 1B and Alternative 1A along segments of Highway 101 and Lomas Santa Fe Drive. This impact would be temporary, lasting only the duration of the bridge construction or retrofit. The bridge construction or retrofit requires a capacity reduction of two lanes across the Highway 101 bridge. If bridge work were to occur simultaneously with other cumulative projects that either add traffic or change the traffic flow in the immediate area, such as the I-5 North Coast Corridor Project that requires lane closures or other roadway restrictions, it is possible that the resulting changes in traffic volumes and roadway capacities could combine to create greater congestion and traffic impacts. This is not foreseeable but it is not unlikely.

Mitigation measures required for Alternative 2A, Alternative 1B, and Alternative 1A include Traffic-1, which requires a traffic control plan, and Traffic-2, which would include notifying motorists of delays and suggesting earlier detour routes. Additional mitigation measures to reduce the traffic congestion were considered, but none were found to be feasible to mitigate the temporary traffic impacts due to bridge construction. Mitigation such as widening the roadway, roadway modifications, or reducing the scale of the project to generate less traffic volume was not considered feasible or appropriate due to the temporary nature of the traffic impact. **For this reason, implementation of Alternative 2A, Alternative 1B, and Alternative 1A would make a cumulatively considerable contribution to a temporary significant cumulative traffic**

impact. As described above, additional mitigation measures detailed in Section 3.10.4 were found to be infeasible at a project level. No additional feasible cumulative mitigation measures have been identified to further reduce the cumulative traffic impacts.

5.3.11 AIR QUALITY

Air quality is typically considered a regional issue, as pollutants can travel long distances, regardless of jurisdictional boundaries. For this reason, the cumulative analysis considers regional air quality throughout the SDAB. However, localized air quality impacts can also result from numerous construction projects in a small area.

The analysis in Section 3.11 found that temporary construction-related emissions would exceed the recommended levels of significance for ROG and NO_x for Alternative 2A, Alternative 1B, and Alternative 1A and construction activities could lead to a violation of an applicable air quality standard. Implementation of mitigation measures requiring reduced-emission equipment and technology would partially reduce anticipated emissions, but not to levels below the applicable thresholds. Thus, potential violations of air quality standards as a result of construction-related activities would remain significant and unavoidable for all three alternatives.

Additionally for Alternative 2A, NO_x emissions associated with ongoing operational maintenance activities would exceed the applicable mass emission threshold and result in a significant direct impact that could not be reduced to below acceptable threshold levels.

The SDAB currently meets NAAQS for all criteria air pollutants except ozone, and meets the CAAQS for all criteria air pollutants except ozone, PM₁₀, and PM_{2.5}. Construction and operation of cumulative projects and general growth and development throughout the region would further degrade the local air quality, as well as the air quality of the air basin. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously. As shown through the cumulative project list, multiple construction projects, including those recently completed as well as projects planned for the future, could have the potential to exceed criteria emission thresholds. Similar to the proposed project, cumulative projects would also be subject to regional air quality regulations and project-specific mitigation measures would be required if thresholds were exceeded. The required adherence to air quality regulations and implementation of mitigation, if necessary, would reduce the potential for significant adverse cumulative air quality impacts to occur throughout the SDAB due to cumulative projects.

A project that produces a significant air quality impact in an area that is out of attainment is considered to significantly contribute to the cumulative air quality impact. Conversely, projects that do not exceed the threshold criteria or can be mitigated to less than criteria threshold levels

are considered insignificant contributors and would not substantially add to the overall cumulative impact. **Because emission levels from all proposed project alternatives could not be mitigated such that pollutant emissions (both temporary and permanent) would be below appropriate thresholds, the proposed project would be making a cumulatively considerable contribution to a significant cumulative air quality impact.** No additional feasible mitigation measures beyond those required in Section 3.11 have been identified at either a project level or a cumulative level that would further reduce the cumulative air quality impact.

5.3.12 NOISE

As detailed in Section 3.12, activities associated with the lagoon restoration and materials placement would result in temporary increased daytime noise levels in the immediate vicinity. However, none of these increased noise levels would be in violation of appropriate daytime noise thresholds and would not exceed allowable noise levels as determined by the local jurisdictions. In general, construction activities would have to occur within 100 feet of a residential property line to have the potential to exceed noise level limits.

Noise is a localized issue and potential impacts extend only as far as noise from a project is audible. For this reason, cumulative impacts would only result when two projects are in proximity and occurring concurrently. It is not reasonable to assume that an additional beach nourishment project would take place at the same time and location as materials placement from the proposed project on a proposed onshore site. However, it is possible that another cumulative project could occur during the same timeframe as lagoon dredging. The I-5 North Coast Corridor and LOSSAN double-tracking projects are examples of cumulative projects that would cross the lagoon in proximity to the proposed project and could potentially overlap with the dredging period. It is not possible to further reduce biological impacts through timing or phasing considerations with these in-lagoon cumulative projects due to requirements for concurrent construction as mandated by the Kehoe Bill.

Other cumulative projects that could occur in the vicinity of lagoon dredging activities may include the Encinitas-Solana Beach Coastal Storm Damage Reduction Project and other beach nourishment projects, Sewer Force Main Replacement, Olivenhain Trunk Sewer Project, JPA Recycled Water Expansion Improvements, improvements at San Elijo State Beach, and Gateway Park. Though other cumulative projects are anticipated to occur within the general lagoon area at some point during dredging operations, it is unlikely that the two projects would occur in such proximity to each other and also within 100 feet of a residential property line that their noise could combine and result in an exceedance of noise level thresholds. While background ambient noise levels might be temporarily increased during simultaneous construction of multiple projects, this increase is not anticipated to be above significant levels at nearby receptors. If

construction of two projects were ongoing at the same time, construction managers would be working in coordination to maintain appropriate distances between active construction areas to ensure the safety of workers and equipment, which would also limit the potential for their noise to combine in excess of daytime noise limits. **Thus, the proposed project would not make a cumulatively considerable contribution to a significant cumulative daytime noise impact.**

However, due to nighttime dredging and materials placement activities, significant impacts have been identified under CEQA for the proposed project. Project design features have been incorporated to limit nighttime noise levels, but even with implementation of these measures nighttime construction outside of allowed hours would result in significant impacts. It is possible that cumulative projects in the lagoon area, such as the I-5 North Coast Corridor Project, may also require nighttime construction outside of permitted daytime hours. **Because the nighttime noise impact outside of allowed construction hours cannot be avoided and other cumulative projects may also require nighttime construction, the proposed project would be making a cumulatively considerable contribution to a significant cumulative nighttime noise impact.** Mitigation measures including noise walls and limiting dredging and materials placement activities to daytime hours were considered to reduce this impact, but rejected as described in Section 3.12.4. These measures were not feasible at a project level and no additional feasible cumulative mitigation measures have been identified to further reduce the cumulative nighttime noise impact.

5.3.13 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

As noted in Section 3.13, though minor, the overall social and economic effects of the proposed project would be beneficial. The lagoon represents a valuable coastal wetland with substantial biological and ecological resources. The alternatives proposing onshore reuse of material would provide beaches with wider and larger sand areas to provide greater recreational opportunities and opportunity for public access, enhance tourism in the region, and provide public property and infrastructure additional protection from wave action and storm events. Material disposal and reuse can cause potential for loss of resources and income for local commercial fishermen; however, no significant impacts were identified relative to these concerns.

Many of the cumulative projects also involve beach sand nourishment opportunities that would result in similar beneficial outcomes for local beaches and the associated economics of improved beach conditions. Some other cumulative projects, such as improvements at Moonlight and San Elijo State Beaches, development of Gateway Park, or trails implemented as part of the I-5 North Coast Corridor Project, would result in improved facilities and opportunities available to the general public. Other cumulative projects would also likely draw from the local labor force and provide beneficial socioeconomic results from wages and revenue. While short-term and

localized impacts to recreational activities, such as surfing or diving, noise to nearby receptors, or increased traffic congestion may occur during implementation of the proposed project or cumulative projects, the long-term result would include beneficial impacts to recreation, tourism, and associated socioeconomic considerations.

Therefore, implementation of the proposed project does not contribute to a cumulative direct or indirect adverse impact to socioeconomics under any alternative.

5.3.14 PUBLIC SERVICES AND UTILITIES

The proposed project would not result in significant impacts to public services and utilities under any alternative. Minimal amounts of utility provision or other public services would be required for the project. The proposed project has been designed to avoid interference with existing utilities and, in the few cases where relocation of infrastructure may be required, coordination with the service provider would minimize potential for substantial service interruptions. A specific utility study in advance of project implementation would ensure that all known utilities are specifically located so that the project can fully avoid the existing utilities or initiate early coordination with the utility provider to reduce and limit interruption of service; this would serve to minimize potential for unanticipated impacts.

Generally, the listed cumulative projects would not result in new construction with substantial increase in demand for utilities or public services. Similar to the proposed project, the cumulative sand nourishment projects would also have a fairly minimal demand for the provision of utilities and would generally not have permanent need for service. Some cumulative projects would serve to improve or replace old or failing utility infrastructure in the area, such as the Sewer Force Main Replacement, Olivenhain Trunk Sewer Project, and JPA Recycled Water Expansion Improvements. Associated with the I-5 North Coast Corridor project, Caltrans is planning a fiber connection to LOSSAN through the lagoon area (Peace 2015). A large project such as the I-5 North Coast Corridor or LOSSAN double-tracking projects would likely require extensive coordination with public service providers due to necessary infrastructure relocations to avoid interrupted service; however, it is not the type of project that necessitates a substantial increase in the long-term demand for public services or utilities.

Because the project does not result in the need for new systems or substantial alterations to existing systems that would have environmental impacts, the proposed project does not make a cumulatively considerable contribution to a cumulative direct or indirect adverse impact to utilities or public services under any alternative.

5.3.15 HAZARDOUS MATERIALS AND PUBLIC SAFETY

Other cumulative projects, such as the I-5 North Coast Corridor and LOSSAN double-tracking projects, may also occur within the lagoon basin in an overlapping timeframe with the SELRP and would also be required to comply with all regulatory safety requirements regarding hazardous materials. The mandatory adherence to regulatory requirements limits potential for cumulative risks associated with the use of hazardous materials. Mitigation has been included that would require the proposed project to implement a sediment management plan to avoid risks associated with unknown contaminants that might be encountered during dredging activities and would ensure that the proposed project would not make a considerable contribution to a public safety risk from unknown contaminants.

As described in Section 3.15, the new inlet and CBFs proposed as part of Alternative 2A could pose a safety hazard to persons who stray too close to these areas as some individuals may place themselves in situations that may result in injury should they be thrown against the CBFs or swept into the inlet or a rip current. Mitigation is included in the proposed project to provide improved lifeguard proximity to this area and public awareness signage. Extensive project design features have been included to ensure no adverse safety hazards result to vessels or the public during project construction for all alternatives.

Implementation of the other cumulative sand nourishment projects could have similar public safety hazards during materials placement. However, as demonstrated with the proposed project, these safety hazards are avoidable through appropriate signage, closures, fencing, barricades, and safety personnel. Additionally, development of cumulative projects would be subject to all regulatory requirements specific to the safe handling and transport of hazardous materials, thus minimizing potential for increased public safety hazards.

The public safety hazard created by the new inlet and CBFs is an extremely localized impact, affecting only the immediate area of those project features, and is mitigated. **Thus, the project does not make a cumulatively considerable contribution to a direct or indirect cumulative public hazard impact.**

5.3.16 GLOBAL CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

A single project is unlikely to have a significant impact on global climate change. However, the cumulative effects of worldwide GHG emissions have been clearly linked to changes in the atmosphere and identified as the main cause of global climate change. For this reason, analysis of GHG emissions from the project, as provided in Section 3.16, is considered a cumulative impact analysis. Section 3.16 provides a complete analysis of GHG emissions for the proposed

project and alternatives. The County of San Diego has established a threshold of 900 MT CO₂e per year as a project-level GHG significance. The GHG emissions from construction and maintenance activities associated with lagoon restoration and materials disposal/reuse for Alternative 2A and Alternative 1B exceed the significance threshold of 900 MT CO₂e per year used for analysis of this project. Construction and maintenance GHG emissions for Alternative 1A would not exceed the recommended level of significance. Mitigation measures required of Alternative 2A and Alternative 1B to reduce GHG emissions include GHG-1, which would evaluate the feasibility and efficacy of performing on-site material hauling with trucks equipped with on-road engines; GHG-2, which would limit deliveries of materials and equipment to the site to off peak traffic congestion hours; GHG-3, which would evaluate the feasibility of restricting all material hauling on public roadways to off-peak traffic congestion hours; and GHG-4 requiring use of high-efficiency equipment. However, these mitigation measures would not reduce emission levels to below the acceptable threshold. **Therefore, implementation of Alternative 2A and Alternative 1B would result in a cumulatively considerable contribution to GHG emissions or global climate change.** As described in Section 3.115.4, no feasible mitigation beyond those measures described above have been identified at a project level to lessen or further reduce emissions to below a level of significance. There are also no additional feasible cumulative mitigation measures available to reduce GHG emissions from construction or operational activities.

Specific to sea level rise and extreme events, the proposed project and alternatives (to varying degrees) would provide a benefit by maintaining and enhancing tidal exchange with the ocean. This enhancement would increase the ability of the lagoon to slowly adapt to changes in sea level over time. Additionally, lowered flood elevation would provide resiliency against floods, other extreme events, and sea level rise. **Therefore, regardless of other projects' cumulative contributions to sea level rise or extreme events, the proposed project and its alternatives would not result in a cumulatively considerable direct or indirect contribution to sea level rise. The project would result in an overall beneficial outcome.**

CHAPTER 6.0

OTHER CEQA/NEPA CONSIDERATIONS

This chapter addresses other topics required by CEQA and NEPA in an EIR/EIS:

- Irreversible and irretrievable commitments of resources and significant irreversible environmental changes
- Growth-inducing impacts
- Relationship between local short-term uses of the environment and long-term productivity
- Effects found not to be significant
- CEQA Appendix F Energy Evaluation

The analysis of the items above is not appreciably different from one alternative to another, but largely relates to whether the project is constructed. Therefore, this discussion does not differentiate between project alternatives.

6.1 SIGNIFICANT IRREVERSIBLE CHANGES TO THE ENVIRONMENT OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

State CEQA Guidelines (14 CCR 15126.2[c]) and NEPA (40 CFR 1502.16) require analysis of significant irreversible and irretrievable effects. CEQA requires evaluation of irretrievable resources to ensure that their use is justified. NEPA requires an explanation of which environmental impacts are irreversible or would result in an irretrievable commitment of resources.

Resources that are irreversibly or irretrievably committed to a project are those typically used on a long-term or permanent basis; however, some are considered short-term resources that cannot be recovered and are thus considered irretrievable. These resources may include the use of nonrenewable resources such as fuel, wood, or other natural or cultural resources. Human labor is also considered a nonretrievable resource because labor used for the proposed action would not be used for other purposes. The unavoidable destruction of natural resources that limit the range of potential uses of that particular environment would also be considered an irreversible or irretrievable commitment of resources.

The proposed project would involve two types of resources: (1) general industrial resources, including capital, labor, fuels, and construction materials; and (2) project-specific resources, such as biological resources, water and soil/sediment resources, land uses, and landforms and visual qualities at the affected sites. The following industrial resources would not be retrievable:

- Nonrenewable resources such as gasoline and diesel oil would be used to power construction equipment and vehicles.
- Nonrenewable energy resources and labor would be necessary to operate barges, trucks, pumps, and equipment used during construction and maintenance activities.
- Electrical power would be used for lighting and potentially dredge operations.
- Energy resources would be required to power the pumps at the intakes and to transport dredged materials to placement sites.

Generally, irreversible environmental changes to the natural environment would occur within the lagoon study area to be excavated and dredged. Many soil and aquatic bottom-dwelling organisms (e.g., plants and invertebrates) living in the lagoon would be destroyed by the construction activities. Although substantial evidence (see Section 3.6 [Biological Resources]) indicates that recolonization and recovery of biological communities would occur in these areas, the length of time can be variable (e.g., 1 to 2 years), and the species occurring would be determined by the type of habitat created. However, the overall project would create a net gain in more biologically productive wetland habitats than presently exist in the project area and would not result in a significant irreversible change to the environment. In addition, construction of a tidal inlet and associated CBFs under Alternative 2A is not an irreversible change. If the wetland were diked to reduce the tidal prism, the inlet would let sand in and CBFs could be removed. The materials placement activities in the cities of Encinitas, Solana Beach, and San Diego would result in the placement of between 160,000 and 1.4 mcy of dredged beach-compatible fill material. This project component would increase protection of existing beaches, which not only provide recreational opportunities for residents but also contribute to the regional tourist industry.

6.2 GROWTH INDUCEMENT

Section 15126(g) of the CEQA Guidelines and the CEQ NEPA Regulations (42 CFR 1508.8) require a discussion of potential growth-inducing impacts of the proposed action and alternatives. Growth may be considered beneficial, adverse, or of no significance environmentally, depending on its actual impacts to the environmental resources present. A project may be growth inducing if it does any of the following:

- Results in development of direct population-generating uses
- Provides accommodations for growth or removes obstacles to growth
- Requires expansion of public services or utilities
- Directly or indirectly fosters economic growth
- Sets a precedent or facilitates other activities that could significantly affect the environment

Restoration of the San Elijo Lagoon and associated materials placement activities would not be considered growth inducing. The proposed project does not include the development of new housing or population-generating uses that would directly or indirectly induce population growth, remove obstacles for future growth, or generate increased demand for public services and utilities in the project area. The proposed project would temporarily require construction workers, but most would be expected to come from the local workforce. While the proposed project would enhance the existing ecological functions of the lagoon and would continue to provide passive recreation opportunities, it is not anticipated that the project would attract sufficient numbers of new visitors to induce the expansion of existing tourist-related commercial uses. The materials placement component of the proposed project would result in a temporary increase in beach area and sand cover at each of the on beach placement sites and would provide for an offshore stockpile of materials for future opportunistic uses. A benefit of this activity would be enhancement or continuation of the recreational usage of each of the onshore placement sites. It must be emphasized, however, that such localized recreational benefits would be temporary (the maximum lifespan of onshore materials placement is approximately 5 years), although the dispersed sand may continue to cycle in the littoral system past that time. The resulting temporary recreational benefits derived from the additional beach area would not be expected to increase the demand for public services and utilities, nor create a need for additional recreational facilities above current projections.

6.3 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The CEQ NEPA Regulations (40 CFR Part 1500 et seq.) require that an EIS discuss issues related to environmental sustainability. In general, this discussion is not considered an environmental effect for which either significance is defined, or mitigation is recommended. However, the discussion, as it relates to environmental consequences, must be included in the EIS. This requires consideration of “the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity” (42 USC 4332[C][iv]).

Short-term use of the environment includes dredging and excavation activities as well as placement of dredged materials in offshore, nearshore, and onshore environments as identified in Chapter 2 and analyzed throughout this document. Short-term construction-related impacts, defined for this project as impacts that occur during construction to project completion, are anticipated from these activities:

- Temporary restrictions to public access in portions of the lagoon and the inlet/beach area to maintain public safety
- Temporary increase in turbidity within the lagoon from construction activities, which could negatively impact water quality for a very short duration (less than 1 day)
- Temporary increases in turbidity and siltation from materials placement at the offshore stockpile sites and/or nearshore Cardiff, which could affect diving conditions
- Temporary restrictions to public beach areas at onshore materials placement sites to maintain public safety
- Temporary visual impacts associated with the presence of construction equipment within the lagoon and at materials placement sites, vegetation removal within the lagoon, and construction of CBFs
- Alteration of existing habitats and displacement or inadvertent extirpation of some organisms, particularly bottom- and soil-dwelling invertebrates and plants
- Temporary traffic-related impacts due to Coast Highway 101 bridge construction or improvements
- Temporary construction emissions in the immediate vicinity of the project site during the approximately 3-year construction period
- Potential for overhead electric poles within the lagoon to be relocated causing minimal or no disruption to service

However, as a whole, the project would create a long-term net benefit overall, defined as 50 years after project completion. Benefits are as follows:

- Helping to restore aquatic functions by opening the tidal channel and maintaining tidal exchange between the ocean and lagoon/wetlands, thereby improving water quality and health of wetland habitat
- Restoring habitat and improving existing habitat values, thereby benefiting threatened and endangered species (light-footed Ridgway's rail and Belding's savannah sparrow)
- Increasing acreage of tidal habitats with beneficial impacts on associated species

- Improving functions and values of existing tidal habitats with beneficial impacts on associated vegetation communities
- Creating nesting areas that would benefit least tern and snowy plover and other waterbirds that may use these sites and would contribute to the restoration of ecosystem functions and values
- Improving lagoon hydrology, which would generally reduce current flood-related hazards to existing infrastructure and adjacent development
- Enhancing tidal circulation, which would facilitate the control of vectors at the lagoon and reduce the public health risk associated with vector-borne diseases
- Preserving the site as an open space reserve and passive recreational area
- Providing beach and littoral cell nourishment along San Diego's north county coastline

6.4 EFFECTS FOUND NOT TO BE SIGNIFICANT

Section 15128 of the CEQA Guidelines requires that the EIR “contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR.” An Initial Study was not prepared for the proposed project; therefore, a brief description of the issue area where effects were found not to be significant is included Table 6-1.

Table 6-1
Effects Found Not to Be Significant

Environmental Issue Area	Effects Found Not to Be Significant Rationale
Agricultural Resources	This project would not convert farmland to nonagricultural use, nor would this project conflict with the existing agricultural zoning, as there is no farmland in the project area. No changes to the existing environment that could result in conversion of farmland to nonagricultural use would occur.
Mineral Resources	No mineral resource that would be valuable to the region and the residents of California would be lost as a result of this project. This project would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Preliminary testing of subsurface deposits indicates that no known mineral resources would be affected by the proposed project.
Population and Housing	The proposed project does not include the development of population-generating uses and would also not displace any existing housing, nor would the project displace any people.

The remaining issue areas included in Appendix G of the CEQA Guidelines were evaluated in detail in Sections 3.1 through 3.16 of this document.

6.5 CEQA APPENDIX F ENERGY EVALUATION

Public Resources Code Section 21100(b)(3) and CEQA Guidelines Section 15126.4 require EIRs to describe, to the extent relevant and applicable, the wasteful, inefficient, and unnecessary consumption of energy caused by a project. Also, CEQA Guidelines, Appendix F, Energy Conservation, states that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

The SELRP would result in the consumptive use of energy required to operate dredges, trucks, pumping equipment, grading equipment, and equipment associated with Coast Highway 101 bridge work. Energy sources such as gasoline and diesel oil would be used to power construction and maintenance equipment and vehicles such as barges, trucks, and pumps. Electrical power would be used for lighting and, potentially, dredge operations.

All alternatives would require the use of energy for project implementation in a generally similar nature, but would vary in degree. Alternative 2A would require the highest level of energy consumption because it would involve the largest volume of dredged material and material placement, and construction of a new Coast Highway 101 bridge. Alternative 1B would require similar energy consumption as Alternative 2A, but at a slightly lower amount due to less dredging and material placement, and only retrofit work on the existing Coast Highway 101 bridge. Alternative 1A would require the least amount of energy use for implementation because it would involve the lowest volume of dredged material and placement, and only retrofit work on the existing bridge. The No Action Alternative would not require energy consumption for construction, as none would occur.

Elements of the project design lend themselves to energy savings, such as the reuse of dredged materials in the littoral zone or local beaches where the material can be pumped directly or be delivered by a short barge trip that minimizes the energy expenditure that would otherwise be required to haul the dredged material to a landfill or other disposal site. Once completed, the SELRP would not generate additional daily vehicle trips, necessitate an increased need for ongoing energy use, or require other energy-consuming activities, with the exception of periodic maintenance.

With the exception of the construction or retrofit work on the Coast Highway 101 bridge, restoration of the lagoon and placement/disposal of the material would not include construction

of structures or other development that would require substantial deliveries or truck trips to transport building materials to the site, or create additional sources of long-term energy consumption. Because of the existing seismic deficiencies of the Coast Highway 101 bridge, it is likely that the work proposed to replace or retrofit the bridge would be undertaken through another project in the near future, if not through the SELRP, and similar energy expenditures would be required.

Although the project would require the use of a variety of energy resources, the energy used for implementation of the SELRP is not considered wasteful, inefficient, and/or unnecessary. The necessary energy consumption would result in the positive benefits of improved lagoon hydrology and ecology, as well as a structurally sound Coast Highway 101 bridge.

Because no energy-related impacts were identified, there are no mitigation or minimization measures proposed. However, certain project design features for the project would promote energy efficiency and would decrease overall energy consumption. For example, PDF-10 requires all equipment engines to be in good working condition and to minimize idling time, and PDF-43 requires that two-way circulation be maintained at all times on public roads, which would avoid the need for lengthy delays or detours.

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CHAPTER 7.0

LIST OF PREPARERS

AECOM

Teri Fenner, Principal and Project Director
Cindy Kinkade, Senior Project Manager
Shannon Pagan, Assistant Project Manager
Kara Friedman, Senior Environmental Analyst
Liz Schneider, Environmental Planner
Lindsay Teunis, Ecologist
Michelle Fehrensens, Senior Environmental Planner
William Graham, Senior Environmental Planner
Joshua Zinn, Wetlands Biologist
Michelle Maloney, Biologist
Lanika Cervantes, Biologist
Tanya Wahoff, Archaeologist/Cultural Resource Specialist
Cheryl Laskowski, Ph.D., Climate Change and Greenhouse Gas Emissions Specialist
Jason Paukovits, Air Quality Specialist
Amy Gardner, Water Quality Specialist
Rey Pellos, Water Quality Specialist
Roma Stromberg, Noise Analyst
Hillary Warren, Environmental Analyst, Socioeconomics
Garrett Avery, ASLA, Landscape Designer
Sheryll Del Rosario, Environmental Analyst
Paul Moreno, GIS Specialist
Brad Stein, GIS Specialist
Dan Brady, Graphic Artist
Therese Tempereau, Technical Editor
Robin Rice/Marisa Fabrigas, Word Processors

M&N

Chris Webb, Senior Coastal Scientist
Weixia Jin, Senior Coastal Engineer
Alan Alcorn, Principal Coastal Engineer
Brian Leslie, Coastal Scientist
Craig Frampton, Coastal Scientist

LLG

John Boarman, P.E., Principal

Christopher J. Mendiara, Associate Principal

Cara Hilgesen, Planner

Merkel & Associates, Inc.

Lawrence Honma, Senior Marine Scientist

Nordby Biological Consulting

Chris Nordby, Principal Biologist

CHAPTER 8.0

AGENCIES AND INDIVIDUALS CONSULTED

Corps; Michelle L. Mattson, Meris Bantilan-Smith, Courtney Stevens

USFWS; Susan Wynn, Carolyn Lieberman, Sally Brown

NMFS; Robert Hoffman, Bryant Chesney

EPA; Elizabeth Goldmann, James Munson

California Coastal Commission; John Dixon, Gabriel Buhr

California State Coastal Conservancy; Megan Cooper

CDFW; Tim Dillingham, David Lawhead

CA State Lands Commission; Jane Smith

CA State Parks and Recreation; Darren Smith

Caltrans District 11; Allan Kosup, Sue Scatolini, Arturo Jacobo, Bruce April

SANDAG; Keith Greer, Bill Prey, Bruce Smith

County of San Diego Department of Parks and Recreation; Megan Hamilton

County of San Diego Department of Planning & Development Services; Maggie Loy, Donna Beddow, Emmett Aquino, Jim Bennett, Ed Sinsay, Susan Hoang, Everett Hauser

County of San Diego Department of Public Works; Anthony Barry

SD Regional Water Quality Control Board; Bruce Postumus, Alan Monji, Linda Pardy

City of Encinitas; Katherine Weldon, Kipp Hefner

City of Solana Beach; Leslea Meyerhoff

North County Transit District; Keith Kranda

Richard Zembal, Wildlife Biologist

Robert Patton, Wildlife Biologist

Surfrider Foundation; Julia Chunn-Heer, Tom Cook

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CHAPTER 10.0

ABBREVIATIONS

AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disability Act
ADT	average daily traffic
ADT	average daily traffic
APE	area of potential effects
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ASBS	Area of Special Biological Significance
Basin Plan	<i>Water Quality Control Plan for the San Diego Basin</i>
BFE	Base Flood Elevation
bgs	below ground surface
BMP	best management practice
BNSF	Burlington Northern Santa Fe Railway
BSA	Biological Study Area for SELRP
BTR	Biological Resources Technical Report
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CAMUTCD	California Manual of Uniform Traffic Control Devices
CBF	cobble blocking features
CCA	California Coastal Act
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCR	California Code of Regulations
CCSTWS	Coast of California Storm and Tidal Wave Study
CDFG	California Department of Fish and Game (currently CDFW)
CDFW	California Department of Fish and Wildlife (previously CDFG)
CDMG	California Division of Mines and Geology
CDP	Coastal Development Permit
CEDAS	Coastal Engineering Design and Analysis System
CEQ	Council for Environmental Quality

CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CIDH	cast-in-drilled-hole
CLOMR	Conditional Letter of Map Revision
CMP	Congestion Management Plan
CNEL	community noise equivalent level
CNG	compressed natural gas
CNPS	California Native Plant Society
Corps	U.S. Army Corps of Engineers
County DPR	County of San Diego Department of Parks and Recreation
County	County of San Diego
CRA	California Resources Agency
CRHR	California Register of Historic Resources
CSC	California Species of Special Concern
CSCC	California State Coastal Conservancy
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DA	Department of the Army
DBW	California Department of Boating and Waterways
DHS	Department of Health Services
DNL	Day/night average sound level
DOC	California Department of Conservation
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
DPH	Department of Public Health
EA	Environmental Assessment
EFH	essential fish habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ENSO	El Nino-Southern Oscillation
EPA	U.S. Environmental Protection Agency
ERL	Effects Range – Low
ERM	Effects Range – Median
ESA	Endangered Species Act
ESHA	Environmentally Sensitive Habitat Areas
FBFM	Flood Boundary and Floodway Map
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

FIRM	Federal Insurance Rate Map
FTA	Federal Transit Administration
GHG	Greenhouse gas
GPS	Global Positioning System
GWP	global warming potential
HA	Hydrologic Area
HAPC	Habitat Area of Particular Concern
HCM	Highway Capacity Manual
HDPE	high-density polyethylene
HU	Hydraulic Unit
HUD	U.S. Department of Housing and Urban Development
I-5	Interstate 5
IPCC	Intergovernmental Panel of Climate Change
ITM	Inland Testing Manual
ITP	incidental take permit
JPA	Joint Powers Authority
lagoon	San Elijo Lagoon
LCFS	Low Carbon Fuel Standard
LCFS	low carbon fuel standard
LCP	Local Coastal Plan
LEDPA	Least Environmentally Damaging Practicable Alternative
LNG	liquefied natural gas
LOMR	Letter of Map Revision
LOS	level of service
LOSSAN	Los Angeles to San Diego Rail Corridor Improvements Project
LUP	Land Use Plan
M&N	Moffatt & Nichol Engineers
MBTA	Migratory Bird Treaty Act
MHCP	Multiple Habitat Conservation Program
MHTL	mean high tide line
MLD	Most Likely Descendent
MLLW	mean lower low water level
MLPA	Marine Life Protection Act
MOA	Memorandum of Agreement
MPA	Marine Protection Act
MPN	most probable number
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSCP	Multiple Species Conservation Program
msl	mean sea level

NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NARA	National Archives and Records Administration
NB	northbound
NCTD	North County Transit District
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
North County MSCP	North County Multiple Species Conservation Program
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSF	National Science Foundation
ODM	Ocean Disposal Manual
OFR	Office of the Federal Registrar
OMWD	Olivenhain Municipal Water District
OPR	Office of Planning and Research
OSCP	Oil Spill Contingency Plan
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PA	Programmatic Agreement
PADI	Professional Association of Diving Instructors
PCE	Passenger Car Equivalence
PCE	Primary Constituent Element
PDF	Project Design Feature
PRC	Public Resources Code
PWP	Public Works Plan
RAQS	Regional Air Quality Strategy
RBSP	Regional Beach Sand Project
REMP	Restoration and Mitigation Enhancement Program
Reserve	San Elijo Lagoon Ecological Reserve
ROD	Record of Decision

ROW	right of way
RPS	renewable portfolio standard
RSM	Regional Sediment Management
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SANTEC	San Diego Traffic Engineers' Council
SAP	Sampling and Analysis Plan
SB	southbound
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCC	State Coastal Conservancy
SCE	Southern California Edison
SCIC	South Coastal Information Center
SCOUP	Sand Compatibility and Opportunistic Use Program
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SDCVCP	San Diego County Vector Control Program
SDED	Supplemental Draft Environmental Document
SDG&E	San Diego Gas & Electric
SDNR	San Diego Northern Railway
SDUPD	San Diego Unified Port District
SELC	San Elijo Lagoon Conservancy
SELDT	San Elijo Lagoon Double Tracking
SELRP	San Elijo Lagoon Restoration Project
SEWRD	San Elijo Water Reclamation Facility
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLC	State Lands Commission
SMARA	Surface Mining and Reclamation Act
SMCA	State Marine Conservation Area
SMGB	State Mining and Geology Board
SPCC	Spill Prevention Control and Countermeasure Plan
SQG	sediment quality guidelines
SRA	Source/Receptor Area
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TDS	total dissolved solids

THPO	Tribal Historic Preservation Officer
TMDL	total maximum daily load
TREP	Transportation and Resource Enhancement Program
USC	United States Code
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
v/c	volume-to-capacity
VMT	vehicle miles travelled
WQO	water quality objective

Chemical Abbreviations

CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalent
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
HFC	hydroflourocarbons
N+N	nitrite and nitrate
NO	nitric oxide
N ₂ O	nitrous oxide
NO ₂	nitrogen dioxide
NO _x	nitrogen oxide
O ₃	ozone
Pb	lead
PCB	polychlorinated biphenyl
PFC	perfluorocarbons
PPM	parts per million
PM _{2.5}	particulate matter 2.5 micrometers or less
PM ₁₀	particulate matter 10 micrometers or less
ROG	reactive organic gas
SF ₆	sulfur hexafluoride
SO ₂	sulfur dioxide
TKN	Total Kjeldahl nitrogen
TN	total nitrogen
TP	total phosphorus

TSS	total suspended solids
VOC	volatile organic compound

Units of Measurement

cfs	cubic feet per second
cy	cubic yard
cy/yr	cubic yards per year
dB	decibel
dBA	decibel on the A-weighted scale
ft	feet
ft/sec	feet per second
hp	horsepower
Hz	hertz
km	kilometer
kWh	kilowatt hour
kVA	kilovolt ampere
kV	kilovolt
L _{dn}	day-night average noise level
L _{eq}	equivalent noise level
mcy	million cubic yard
mgd	million gallons per day
mg/L	milligrams per liter
ml	milliliters
mm	millimeters
mpg	miles per gallon
mph	miles per hour
MT	million tons
NTU	nephelometric turbidity unit
ppm	parts per million
ppt	parts per thousand
μm	microns
μg/kg	micrograms per kilogram
μg/L	micrograms per liter

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CHAPTER 11.0

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