EXECUTIVE SUMMARY

ES.1 INTRODUCTION AND OVERVIEW

This Environmental Impact Report (EIR) has been prepared by the San Diego Association of Governments (SANDAG) to evaluate potential environmental effects that would result from development of the proposed Buena Vista Lagoon Enhancement Project (Enhancement Project). This EIR has been prepared in conformance with the California Environmental Quality Act of 1970 (CEQA) statutes (Cal. Pub. Res. Code, Section 21000 et seq., as amended) and the CEQA Guidelines (Cal. Code Regs., Title 14, Section 15000 et seq., 2010). SANDAG is identified as the lead agency for the Enhancement Project under CEQA.

Buena Vista Lagoon, also referred to as "the lagoon," is located at the boundary between the Cities of Carlsbad and Oceanside in northern San Diego County. A number of individuals and agencies own portions of the lagoon, including the California Department of Fish and Wildlife (CDFW), whose lands are designated as a State Ecological Reserve. The lagoon is surrounded by urban development and traversed by a number of transportation corridors, all of which have contributed to a continual degradation of the lagoon over time. The Enhancement Project would enhance the lagoon to improve both its ecological and recreational values through implementation of one of a range of alternatives.

ES.2 PROJECT BACKGROUND

Historically, (i.e., pre-1940s), Buena Vista Lagoon was in a dynamic equilibrium between a tidally influenced saltwater system during dry conditions and a river-influenced freshwater system during wet weather conditions. The combination of these inputs resulted in the creation of extensive salt flat habitats covering approximately 75 percent of the lagoon. Historical records indicate that an additional 23 percent of lagoon area was composed of salt marsh habitat (Beller et al. 2014). In 1940, the lagoon converted to a predominantly freshwater system as a result of installation of a weir ~~(a type of barrier)~~ across the lagoon outlet that precluded saltwater from entering the lagoon (Everest 2004; Beller et al. 2014). A weir is a low dam that is built across a river to raise the water level, divert the water, or control its flow (www.dictionary.com). The existing weir, built in 1972 and spanning approximately 50 feet, maintains a minimum water level within the lagoon at an elevation of 5.6 feet National Geodetic Vertical Datum (NGVD). Sedimentation from the watershed upstream of the lagoon has accumulated within the lagoon basins, leading to decreasing water depths and increasing nutrient levels. Additional influences from adjacent urbanization have affected water quality, including runoff from adjacent roadways and development, as well as releases of sewage into the lagoon. Beginning in the 1970s,

encroachment of nonnative vegetation into the open water basins of the lagoon has been occurring, leading to water quality and vector issues as circulation decreases.

The lagoon has been progressively degrading in terms of benefits and value to biological communities, habitats, and human recreational uses. The Feasibility Study conducted for the Enhancement Project in 2004 found that, between 2030 and 2050, the lagoon was expected to become a vegetated freshwater marsh or riparian woodland-meadow (Everest 2004). ~~Without enhancement, the lagoon is expected to become a vegetated freshwater marsh or riparian woodland-meadow within the next 30 to 50 years (Everest 2014a).~~ This transition could reduce coastal habitat biodiversity or eliminate saltwater marsh coastal wetland functions and values, and result in decreased water circulation, leading to increased concerns about vectors and water quality impairments.

Buena Vista Lagoon is owned and managed by a number of different individuals and agencies. CDFW owns and manages the majority of the lagoon. The portion of the lagoon owned by CDFW was designated as a State Ecological Reserve in 1968, as described in Title 14, Section 630 of the California Code of Regulations. This reserve represents the first state-designated ecological reserve. The lagoon also encompasses other landowners. Portions of the Weir Basin are owned and maintained by the St. Malo Homeowner's Association (HOA), representing a private development located on the west side of the lagoon. The weir itself is owned by a private individual, as well as the surrounding channel. On the north side of the Coast Highway Basin, the Buena Vista Lagoon Audubon Society Nature Center (Nature Center) ~~owns and~~ manages informal trails along the northern shore. Rights-of-way associated with the North County Transit District (NCTD) Los Angeles to San Diego (LOSSAN) railroad corridor, Carlsbad Boulevard, and Interstate 5 (I-5) also extend through the lagoon. Since 2001, numerous federal, state, and local agencies and organizations have been engaged in planning efforts for enhancement of the lagoon.

In July 2012, SANDAG became involved in enhancement efforts for the Buena Vista Lagoon as a component of the North Coast Corridor Public Work Plan/Transportation and Resource Enhancement Program (PWP/TREP) (Caltrans 2014a). That document was prepared to address comprehensive, system-wide transportation and transit improvements proposed by the California Department of Transportation (Caltrans) and SANDAG within the north San Diego coastal corridor. It identifies transportation and transit mitigation and enhancement opportunities, including bicycle and pedestrian circulation improvements, trail improvements, and transportation facilities construction, as well as habitat enhancement/restoration, and compensatory mitigation projects to provide "functional lift" to coastal resources. The PWP/TREP identifies opportunities to improve ecological health and hydrological connectivity to enhance coastal resources and habitats within the corridor, including the Enhancement Project.

The PWP/TREP includes the Resource Enhancement and Mitigation Program (REMP), which provides for mitigation planning and implementation through the I-5 North Coast Corridor PWP/TREP process to effectively mitigate project impacts in a manner that addresses regionally significant resource enhancement and preservation needs. As part of the PWP/TREP preparation, Caltrans completed a set of lagoon optimization studies, including the I-5 Bridge Study at Buena Vista Lagoon (Everest 2012). This study identified optimized channel dimensions from a hydraulic perspective at the different infrastructure crossings within the lagoon (e.g., railroad, Highway 101, I-5). Since identifying the Enhancement Project in 2012 as one of several potential opportunities to improve the ecological health and enhance coastal resources and habitats within the corridor, SANDAG has been compiling lagoon studies and information, and has reinitiated the effort to design an enhancement plan for the lagoon at the request of the Cities of Carlsbad and Oceanside.

ES.3 PROJECT LOCATION AND SETTING

As previously discussed, Buena Vista Lagoon is located in northern San Diego County and spans the boundary between the Cities of Carlsbad and Oceanside. The lagoon encompasses approximately 220 acres and includes the Buena Vista Lagoon Ecological Reserve managed by the CDFW. The lagoon is fed by Buena Vista Creek, which drains approximately 20 square miles of the Buena Vista Watershed into the Pacific Ocean. The project site also includes placement sites for materials dredged periodically from the lagoon, as described in Section ES.3.2.

ES.3.1 LAGOON CHARACTERISTICS AND BACKGROUND

Buena Vista Lagoon is a freshwater lagoon containing coastal wetland habitat used by a number of wildlife species. Due to these characteristics, a majority of the lagoon is owned by CDFW and designated as a State Ecological Reserve. The lagoon is divided by three crossings (from east to west: I-5, Carlsbad Boulevard (South Coast Highway in the City of Oceanside), and the LOSSAN railroad tracks. These crossings create four basins, from east to west: the I-5 Basin, Coast Highway Basin, Railroad Basin, and Weir Basin.

The lagoon is a large water feature that serves as a landmark and de facto boundary between the Cities of Oceanside and Carlsbad. Both of these cities have in proximity to the lagoon mix of residential and commercial development of varying densities, and substantial transportation features (highway and railroad), and both cities are influenced by the adjacent Pacific Ocean. To the west of I-5, the lagoon is generally surrounded by single- and multi-family residences to the north and south. To the east of I-5, the northern and eastern lagoon boundaries consist of highway (State Route 78 [SR 78]) and commercial uses, with residential uses atop hillsides to the

south. The lagoon basins are vegetated around the perimeter with open water in the middle, with the densest vegetation occurring in the easternmost I-5 Basin.

Currently, multiple owners and agencies provide ongoing maintenance activities within and adjacent to the lagoon. CDFW has been making an effort to manage cattails within the lagoon to improve vector control, although methodologies are still being identified to provide effective removal of established cattail stands that are too dense for standard aquatic mowers (CDFW 2014). The St. Malo HOA conducts vegetation removal and other maintenance activities in the Weir Basin. The City of Oceanside periodically removes the sandy beach berm that builds up on the beach west of the weir. Additionally, the Nature Center conducts trail maintenance on informal trails and pathways along the northwestern shore of the Coast Highway Basin.

ES.3.2 LITTORAL ZONE NOURISHMENT SITE CHARACTERISTICS AND BACKGROUND

There are two locations near the lagoon, Oceanside and North Carlsbad, where materials dredged from the lagoon during enhancement activities may be placed, depending upon grain size, which influences suitability for beach or nearshore placement. The Oceanside placement site includes both onshore and nearshore areas. The onshore Oceanside site is approximately 0.8 mile long and located north of the lagoon outlet. This onshore site consists of typically sandy beach between Wisconsin Street and Morse Street where riprap (large boulders) has been placed to protect beach front residential structures. The placement site is not the currently permitted site specified under the existing Oceanside Beach Fill Program. The nearshore Oceanside site is under water with a bottom characterized by sand. The North Carlsbad placement site is an onshore site extending approximately 3,000 feet from immediately south of the lagoon outlet to Oak Street. The North Carlsbad placement site is a typically sandy beach backed by residences. The character of each placement site varies by season, tide, storm damage, and periodic beach nourishment activities. Both the Oceanside and North Carlsbad locations have had sand placed directly on their shorelines as part of the 2001 and 2012 Regional Beach Sand Projects (RBSPs).

ES.4 PROJECT OBJECTIVES

The overall purpose of the Enhancement Project is to enhance the biological and hydrological functions and recreational values of Buena Vista Lagoon by addressing increased sedimentation and invasive vegetation encroachment, as well as resulting declining coastal biodiversity, degrading water quality, water circulation restriction, and increased vector concerns. Accordingly, the primary objectives of the Enhancement Project include the following:

- Enhance and maintain sensitive habitats and native species, including rare and endangered species, to promote coastal biodiversity within the region.

- Promote a system of native wetland and terrestrial vegetation communities that can be sustained given the opportunities and constraints of the lagoon and anticipated sea level rise.
- Create conditions that curtail the growth and expansion of cattails, bulrushes, and invasive species.
- Protect, improve, and maintain water quality (e.g., reduce eutrophication) to meet water quality standards and address the 303(d) listed water quality impairments.
- Reduce vector concerns (e.g., potential for mosquito-borne disease) by minimizing potential mosquito breeding habitat.
- Maintain or reduce current flood risk to existing infrastructure and adjacent development.
- Maintain or enhance public access to the lagoon and recreation opportunities that are consistent with resource protection.
- Minimize cost of construction and maintenance.

To achieve these objectives, the Enhancement Project would incorporate a suite of actions, including the following:

- Enhancement in all basins
- Vegetation removal and/or management to increase circulation/decrease vectors
- Infrastructure improvements where appropriate to increase circulation while not increasing the risk of flooding
- Improvements to public access by construction of recreational amenities, where possible, including an elevated pedestrian boardwalk and fishing access (where applicable)
- Adaptive management strategies to maintain enhanced functions of the lagoon into the future

ES.5 DESCRIPTION OF PROJECT COMPONENTS AND ALTERNATIVES

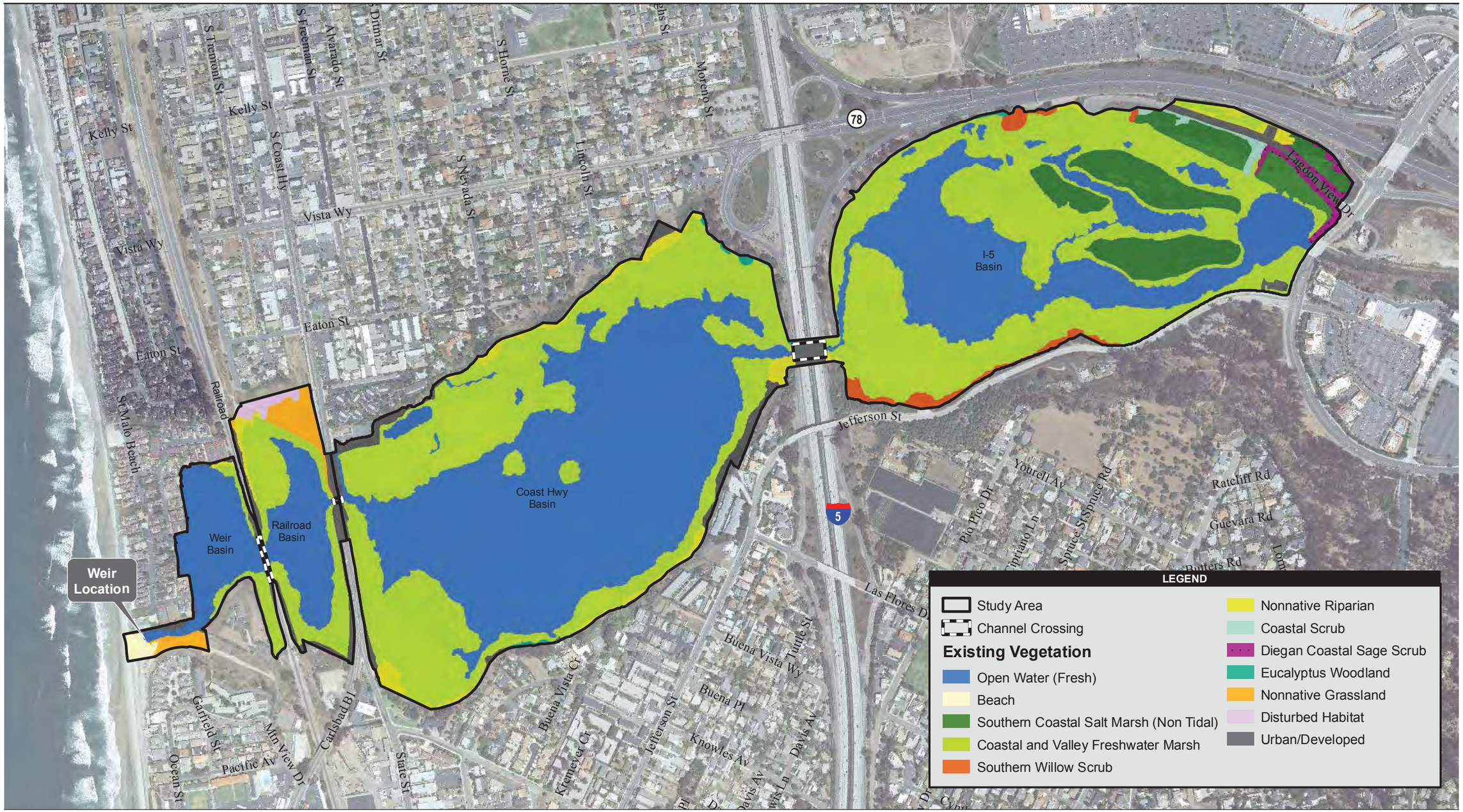
The Enhancement Project would address the continued ecological degradation of Buena Vista Lagoon through enhancement of its biological and hydrological functions, which will also improve recreational values. A range of alternatives that meet the objectives of the Enhancement Project have been analyzed in an equal level of detail. The analysis within this document and associated stakeholder/public input obtained through the environmental review process will drive

selection of the preferred alternative. All alternatives identified in this document are analyzed at an equal level of detail to facilitate identification of the preferred alternative and the ultimate selection of an alternative for implementation. The alternatives carried forward for detailed analysis in this EIR include:

- Freshwater Alternative
- Saltwater Alternative
- Hybrid Alternative – Options A and B
- No Project Alternative

Proposed habitat distributions associated with each enhancement alternative are shown in Figures ES-1 through ES-5, respectively. As further discussed in Section ES.6.2 below, an effort has been made to proactively incorporate measures into each of the alternatives to minimize and avoid, where possible, impacts to resources. These project design features are outlined in Table ES-9. The Enhancement Project also involves several design elements/considerations common to multiple build alternatives analyzed within this EIR, such as infrastructure improvements, that would be implemented as part of the enhancement project or by others. Those common project components include an elevated pedestrian boardwalk (Boardwalk), proposed I-5 bridge replacement (implemented by Caltrans), and proposed NCTD LOSSAN Improvements (implemented by SANDAG), which would be implemented regardless of the enhancement alternative. Each of these projects has independent utility and could be constructed and usable without the others; however, if selected, the Enhancement Project is anticipated to be built at the same time as the proposed North Coast Corridor infrastructure is constructed, per the Kehoe Bill. Consistent with Senate Bill 468, I-5 and railroad bridge improvements over the lagoon would occur concurrently with the Enhancement Project. However, these bridges are not part of the Enhancement Project and the environmental analysis for these projects proposed (and constructed) by others is addressed in other documents (SCH No. 2002031067/SCH No. 2004101076).

Some of the alternatives would also include improvements to the Carlsbad Boulevard bridge structure (under the Saltwater and Hybrid Alternatives) and the creation of subtidal or deep-water fish areas designed to promote fishing activities within the lagoon, as applicable. These common components are described in Section ES.5.1.



Source: SANDAG 2012; Sangis; Everest; AECOM 2014

600 300 0 600 Feet

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

Figure ES-1

Project Location and Existing Habitat Distribution Map

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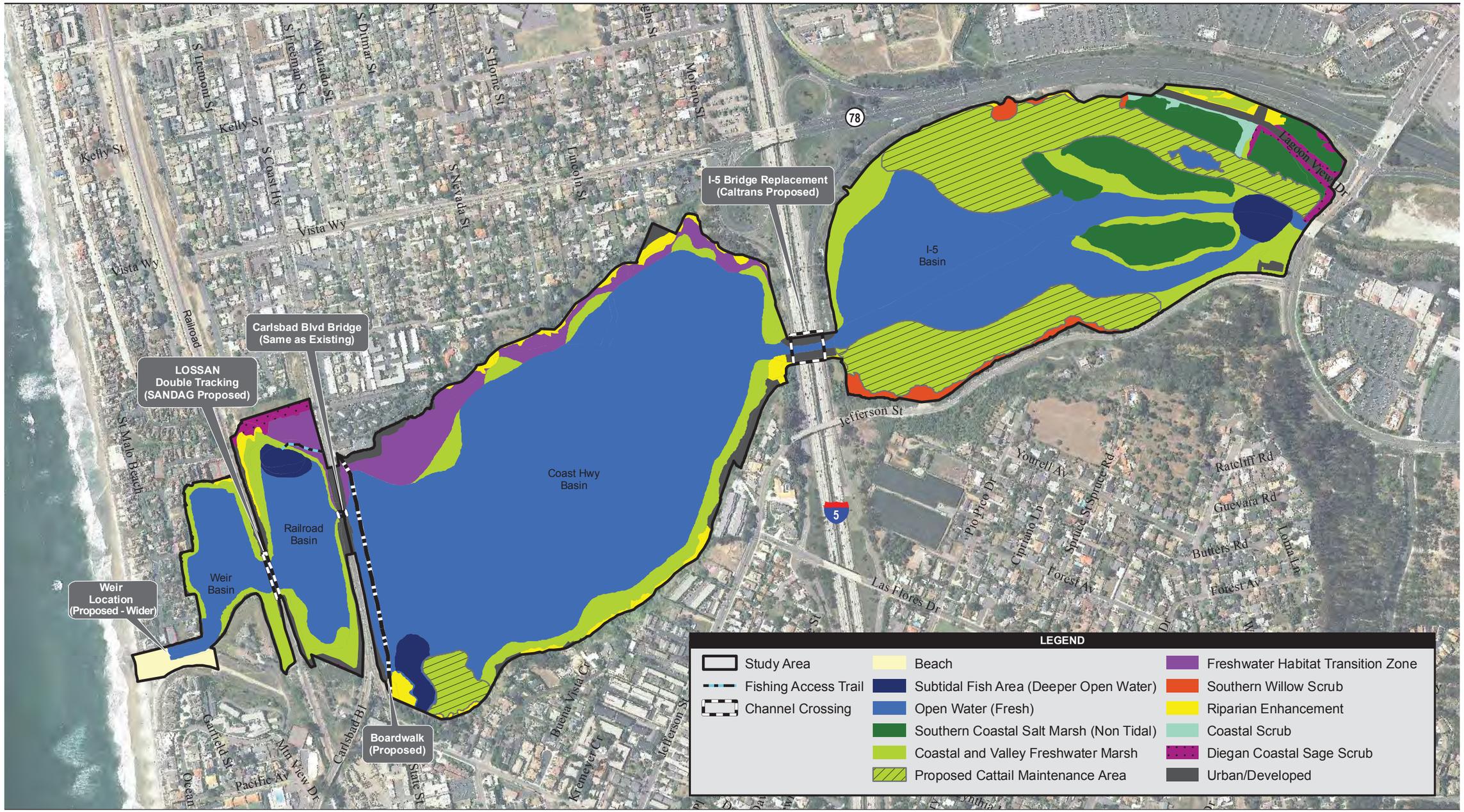

Source: SANDAG 2012; Sangis; Everest; AECOM 2014

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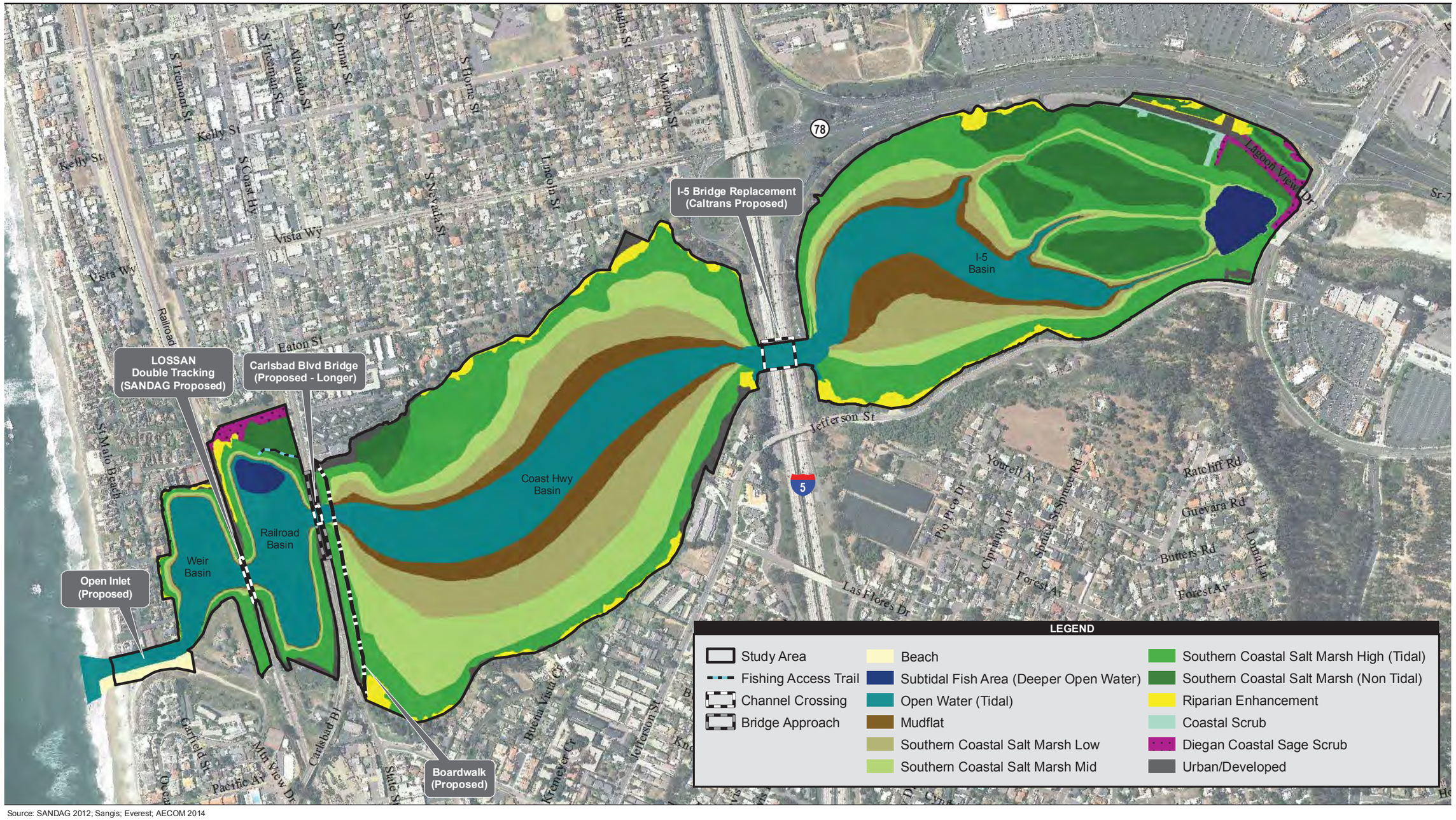
Scale: 1:7,200; 1 inch = 600 feet

Figure ES-2
Proposed Freshwater Alternative Habitat Distribution

Path: P:\2013\60288954_BVLEP_EIR\06GIS\6.3_Layout\Reports\ExecutiveSummary\Freshwater.mxd, 3/18/2015, steinb



Source: SANDAG 2012; Sangis; Everest; AECOM 2014

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

Figure ES-3
Proposed Saltwater Alternative Habitat Distribution

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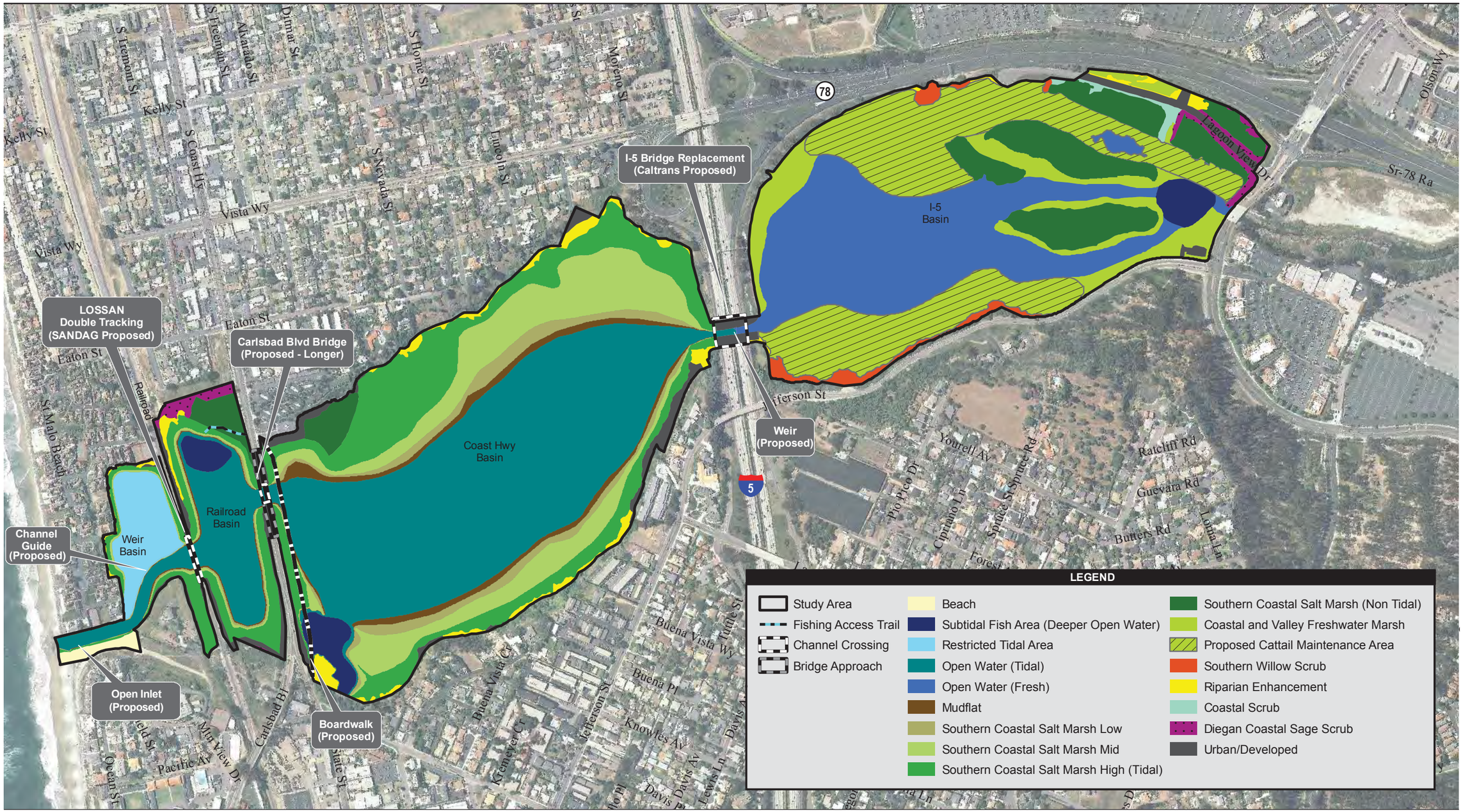

Source: ; AECOM; Everest 2014

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

Figure ES-4
Proposed Hybrid Alternative Option A Habitat Distribution

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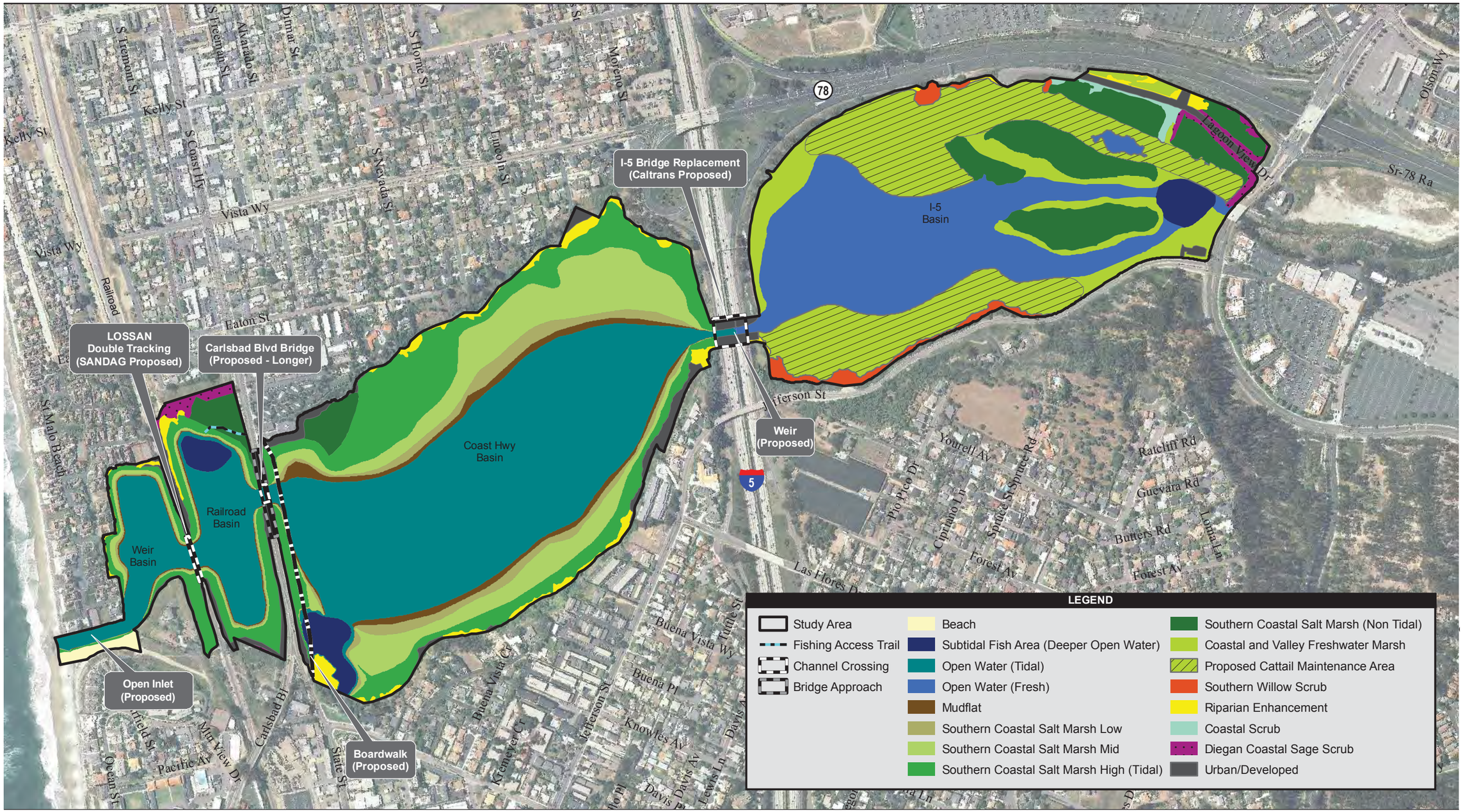

Source: ; AECOM; Everest 2014

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

Figure ES-5
Proposed Hybrid Alternative Option B Habitat Distribution

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ES.5.1 COMPONENTS COMMON TO MULTIPLE ALTERNATIVES

Boardwalk

A Boardwalk would be incorporated into each of the enhancement alternatives. The Nature Center is located at the northwestern edge of the Coast Highway Basin, just east of Carlsbad Boulevard as it transitions to South Coast Highway in the City of Oceanside. Maxton Brown Park is located on the southwestern shore of the Coast Highway Basin, just east of Carlsbad Boulevard. Carlsbad Boulevard extends north-south across the lagoon between the Nature Center and Maxton Brown Park, and provides vehicular access across the lagoon.

As part of the Enhancement Project, a Boardwalk would be constructed parallel to the roadway to further increase connectivity between the Cities of Oceanside and Carlsbad, and enhance public access to the lagoon both physically and visually. The Boardwalk would extend between the Nature Center and Maxton Brown Park, creating a continuous pedestrian-only route within open space directly adjacent to and within the lagoon. The Boardwalk would provide a separated pedestrian facility elevated above vegetation to provide visibility to the interior of the lagoon. Six, 12-foot-wide overlooks would be incorporated into the Boardwalk to accommodate benches and vista points to enhance passive recreation. Additionally, the Boardwalk would accommodate a range of recreational activities, including fishing, walking, nature study (e.g., bird watching), education, and interpretation of the site's unique ecological habitat. Construction of the Boardwalk would complement existing and proposed trails within the Cities of Oceanside and Carlsbad.

The Boardwalk would be constructed of timber, with 42-inch wood handrails, including a mid-rail, to blend with the existing natural setting. The elevated Boardwalk would be located approximately 20 feet away from the edge of pavement along Carlsbad Boulevard, partially within the Reserve and partially within the Carlsbad Boulevard right-of-way in the City of Carlsbad. The deck would be located above the 100-year flood water surface elevation at approximately 12 feet NGVD. This would prevent flooding and enable users to view large portions of the lagoon. The structure would be accessed by three sets of stairs extending to Carlsbad Boulevard, as well as 6-foot-wide paths connecting to the Nature Center and Maxton Brown Park on either end to facilitate pedestrian flow and accessibility. Design for foundations, landings, platforms, rest areas, handrails, and the walking surface would comply with local and state codes.

Carlsbad Boulevard Bridge

The Freshwater Alternative would remove accumulated sediment and vegetation from the existing channel under Carlsbad Boulevard; however, the existing channel and bridge would remain in their current condition. Under the Saltwater and Hybrid Alternatives, the channel would be expanded and the bridge structure would be replaced at a higher elevation. The proposed improvements to the Carlsbad Boulevard bridge and channel under these two alternatives would occur to accommodate increases in the hydraulic connectivity between the Coast Highway and Railroad Basins.

The existing structure is a 29-foot-long bridge within a 54-foot-wide cross section. Under the Saltwater and Hybrid Alternatives, the channel extending under Carlsbad Boulevard would be expanded to 110 feet, as identified in the bridge optimization study (Everest 2012) prepared for the lagoon. This expansion of the channel would require replacement of the existing bridge. The proposed new bridge would be constructed as part of the Enhancement Project and is evaluated in this EIR. The structure would remain 54 feet wide and would be constructed within the same right-of-way and horizontal alignment as the current bridge. To accommodate flood flows under the bridge and eliminate flooding of the roadway during storm events, the roadway elevation would be raised to 14 feet NGVD from the existing 9.6-foot NGVD elevation. Approaches would be constructed in compliance with Caltrans stopping sight distance requirements, resulting in reconstruction of bridge approaches extending approximately 300 feet north and south of the proposed structure. The bridge would be constructed as a two-span structure and would require the installation of pilings in the underlying channel to support the spans.

I-5 and NCTD LOSSAN Improvements

Two infrastructure improvements are planned within the lagoon as part of other proposed projects. These improvements are replacement of the I-5 bridge over the lagoon as part of the North Coast Corridor Project and construction of the I-5/SR 78 interchange proposed by Caltrans, and double-tracking the railroad tracks extending through the lagoon as part of the LOSSAN project proposed by SANDAG. These improvements are assumed to be implemented by Caltrans and SANDAG regardless of the enhancement project alternative. Senate Bill 468 (Kehoe) mandates that transportation improvements and regional habitat enhancements within the north coast corridor occur concurrently, unless construction in phases would result in an environmentally superior alternative to concurrent construction. While these projects would not be constructed as part of the proposed Enhancement Project, consistent with Senate Bill 468, it is anticipated I-5, I-5/SR 78 interchange, and railroad bridge improvements over the lagoon would occur concurrently with the Enhancement Project or would be built to accommodate any of the project alternatives. If the Enhancement Project does not occur (e.g., under the No Project

Alternative), it is assumed that the infrastructure improvement projects along I-5 and the LOSSAN corridor would still move forward concurrent with each other. The environmental analysis for the I-5 and NCTD LOSSAN improvements is addressed in other environmental documents, SCH No. 2004101076 and SCH No. 2002031067, respectively. These projects are proposed and would be constructed and maintained separately from the Enhancement Project, The I-5/SR 78 Interchange Project proposed by Caltrans is in the planning phase.

~~Subtidal~~ Deep-Water Fish Areas

Fishing is an existing recreational resource in the lagoon, and maintaining a variety of water depths and substrates to encourage the continued presence of fish, either under freshwater or saltwater conditions, is important to maintaining the biological health of the lagoon fisheries. Relatively deep ~~subtidal~~ fish areas would be created under each of the build alternatives.

Current freshwater fish populations are dominated by bass, a nonnative species. The Freshwater Alternative and the freshwater (eastern) portion of the Hybrid Alternative would incorporate deeper freshwater areas, providing a better range of depths for fish habitat enhancement and deep water refugia for freshwater or marine fish species. This would benefit the existing fish populations and contribute to maintaining/increasing the quality of recreational fishing opportunities. Design criteria for freshwater fishing opportunities would include creating areas with depths between 8 and 12 feet, and providing substrates for both the spawning and nursery phases of the life cycle. Slopes would be created along the edge of the fishing areas with hard substrate (e.g., small pea gravel) at depths where sunlight can reach the bottom surface (e.g., 6 feet). Specific spawning habitat would be created on sides of the fishing areas least accessible for fishing (e.g., on the interior of the lagoon basin, or along the border with vegetation). Nursery habitat would include areas of submerged vegetation, which could include cattails under freshwater conditions. In the absence of such ~~subtidal~~ shelter, adaptive management strategies would include the potential creation of nursery areas with material such as disposed pine trees, manzanita, or other woody vegetation. Fishing areas would also be located along the edge off the lagoon basins to minimize wave action that could lead to nest failure (e.g., in the northeast corner of the Railroad Basin and the southwest corner of the Coast Highway Basin).

The Saltwater Alternative and saltwater (western) portion of the Hybrid Alternative would incorporate deeper areas designed to encourage saltwater fish presence in the lagoon. Anticipated salinity levels associated with these alternatives would exceed the upper tolerance range of the freshwater fish species currently present in the lagoon. However, conversion to a saltwater system would encourage saltwater fish species to enter and use the lagoon during various life history stages. The lagoon could provide fertile rearing habitat, and possibly spawning habitat, for a variety of native saltwater fish species. Additionally, species assemblages, population

structure, and richness are likely to change through time as a result of temporal changes to saltwater habitat complexity and composition (e.g., development of ~~kelp and~~ eelgrass beds) and primary production. Based on other similar saltwater lagoons in the areas, it is anticipated that saltwater marine species would populate Buena Vista Lagoon under the new saltwater condition in size and abundance to support recreational fishing. Sport fish species popular among recreational anglers that could population the lagoon may include halibut, spotted bass, barred sand bass, various sharks and rays, diamond turbot, striped mullet, and spotfin croaker. Thus, it is anticipated that a full or partial conversion to a saltwater system would allow for continued recreational fishing throughout the lagoon and provide a similar level of opportunity for recreational fishing within the new saltwater environment.

ES.5.2 ALTERNATIVES CHARACTERISTICS

Based on water regime within the lagoon, three alternatives have been identified for analysis in this EIR: the Freshwater, Saltwater, and Hybrid Alternatives. Two design options have been identified for the Hybrid Alternative. Table ES-1 provides a summary of the habitat distribution under existing conditions and for each of the proposed enhancement alternatives. Table ES-2 provides a summary of existing hydraulic connections (i.e., infrastructure dimensions) and those proposed under each of the enhancement alternatives. Table ES-3 provides a summary of the materials removal and periodic maintenance requirements for each of the proposed enhancement alternatives.

These tables summarize the components of the proposed build alternatives. More detail regarding habitat distribution, infrastructure, and materials removal associated with each of the specific alternatives is included in the following paragraphs. Work for each of the alternatives would be located outside existing Caltrans' right-of-way along I-5 and SR 78, with the exception of channel improvements under I-5, as necessary. A detailed discussion on how construction and maintenance activities would occur is included in Section ES.6.

Freshwater Alternative

Under the Freshwater Alternative, the hydrologic regime of the lagoon would remain a freshwater system influenced primarily by freshwater entering the lagoon from the upstream watershed in the eastern portion of the system and along the boundary of the lagoon. Primary loss of water in the lagoon occurs via evapotranspiration and seepage, and large inflows occur during infrequent substantial storm events, when water overtops the weir and the beach berm.

Table ES-1
Existing and Proposed Habitat Distribution (Acreages)

Habitat Type	Existing Condition	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative (Options A and B)
Beach	0.6	1.3	0.8	0.8/0.8
Coastal and Valley Freshwater Marsh	96.2	24.7	--	10.2/10.2
Coastal Scrub	0.6	0.6	0.5	0.7/0.7
Deep Open Water	--	4.5	4.0	5.0/5.0
Diegan Coastal Sage Scrub	<0.1	0.6	0.8	0.8/0.8
Diegan Coastal Sage Scrub: Baccharis-Dominated	1.3	1.6	1.3	1.3/1.3
Disturbed Habitat	0.7	--	--	--
Eucalyptus Woodland	0.5	--	--	--
Freshwater Habitat Transition Zone	--	9.2	--	--
Mudflat	--	--	20.0	4.7/4.9
Nonnative Grassland	2.4	--	--	--
Nonnative Riparian	4.2	--	--	--
Open Water	106.8	133.4	51.0	99.3/98.6
Proposed Cattail Maintenance Area	--	32.9	--	30.5/30.5
Riparian Enhancement	--	4.5	6.6	4.6/4.6
Southern Coastal Salt Marsh (Non Tidal)	14.8	14.8	23.2	17.9/17.9
Southern Coastal Salt Marsh High	--	--	55.0	26.5/26.5
Southern Coastal Salt Marsh Low	--	--	33.2	6.3/6.5
Southern Coastal Salt Marsh Mid	--	--	35.4	20.3/20.6
Southern Willow Scrub	2	2.2	--	2.2/2.2
Urban/Developed	8.7	8.0	6.5	7.3/7.3
Totals	**238.3**	**238.3**	**238.3**	**238.3/238.3**

[1] Totals may not add due to rounding and slight differences in project study area.

Table ES-2
Hydraulic Connection Summary

Infrastructure	Hydraulic Connection			
	I-5 Bridge	**Carlsbad Boulevard Bridge**	**Railroad Bridge**	**Weir/Inlet**
Existing Conditions				
Weir Top Width (feet)	N/A	N/A	N/A	50 weir
Weir Invert Elevation (feet NGVD)	N/A	N/A	N/A	+5.6
Channel Bottom Width (feet)	36	29	200	N/A
Channel Invert Elevation (feet NGVD)	+2.0	-3.0	+3.0	N/A
Channel Side Slope (horizontal/vertical)	1.5/1	Vertical	4.5/1 (N Side) 18/1 (S Side)	N/A
Freshwater Alternative				
Weir Top Width (feet)	N/A	N/A	N/A	80 weir
Weir Invert Elevation (feet NGVD)	N/A	N/A	N/A	+5.6
Channel Bottom Width (feet)	36	29	90[1]	N/A
Channel Invert Elevation (feet NGVD)	+2.0	-3.0	-2.5	N/A
Channel Side Slope (horizontal/vertical)	1.5/1	Vertical	8.5/1 (N Side) 11.5/1 (S Side)	N/A
Saltwater Alternative				
Channel Bottom Width (feet)	160	110	90[1]	100 inlet top width
Channel Invert Elevation (feet NGVD)	-2.5	-2.5	-2.5	-2.0
Channel Side Slope (horizontal/vertical)	2/1	Vertical	8.5/1 (N Side) 11.5/1 (S Side)	2/1
Hybrid Alternative				
Channel Bottom Width (feet)	36	110	90[1]	100 inlet top width
Channel/Spillway Invert Elevation (feet NGVD)	+2.0/+5.6	-2.5	-2.5	-2.0
Channel Side Slope (horizontal/vertical)	1.5/1	Vertical	8.5/1 (N Side) 11.5/1 (S Side)	2/1

Notes:
1. The channel at the railroad bridge would be deepened from existing conditions; the channel bottom would be narrower than existing conditions, while the width at +3 feet NGVD would remain 200 feet.

Table ES-3
Materials Removal and Maintenance Requirements

	Freshwater Alternative		Saltwater Alternative		Hybrid Alternative	
	Vegetation	**Sediment**	**Vegetation**	**Sediment**	**Vegetation**	**Sediment**
Initial Volume Removed During Construction (cy)	129,000	562,000	211,000	781,000	148,500	833,000
I-5 Basin	29,500	188,000	92,000	320,500	29,500	188,000
Coast Highway Basin	89,500	290,500	103,500	293,000	103,500	488,000
Railroad Basin	9,500	62,500	14,000	101,000	14,000	95,000
Weir Basin	500	21,000	1,500	67,000	1,500	62,000
Maintenance Type/Amount/Location	1.0 acre of cattail removed from I-5 and Coast Highway Basin maintenance areas	NA[1]	NA	27,000 cy Inlet/Weir Basin/Railroad Basin	0.9 acre of cattail removed from I-5 Basin maintenance area	27,000 cy Option A: Inlet/Railroad Basin/Coast Highway Basin Option B: Inlet/Weir Basin/Railroad Basin
Inlet Maintenance Frequency/Duration	Every 1-2 years for 1 week, outside of bird nesting season	NA	NA	Inlet/Weir Basin every 12–20 months for 2-4 weeks	Every 1-2 years for 1 week, outside of bird nesting season	Option A: Inlet/Railroad Basin every 12–20 months for 2-4 weeks Option B: Inlet/Weir Basin every 12–18 months for 2-4 weeks
Maintenance Construction Approach/Material Disposal	Water-based vegetation mower or land-based equipment near lagoon edge; trucked to green waste facility~~landfill~~	NA	NA	Backhoes, front loaders, scrapers, and dump trucks with placement at North Carlsbad Beach south of inlet	Water-based vegetation mower or land-based equipment near lagoon edge; trucked to ~~landfill~~green waste facility	Backhoes, front loaders, scrapers, and dump trucks with placement at North Carlsbad Beach south of inlet.

[1] The variable and difficult to predict nature of sediment patterns and storm events, which would have a large impact on sedimentation under the Freshwater Alternative, makes calculations of further maintenance needs highly speculative. Therefore, although maintenance is anticipated to be required approximately every 25 years, the Enhancement Project does not assume additional sediment removal as part of this alternative.

Habitats supported under this alternative would remain primarily freshwater marsh and open freshwater habitat, and would be similar to those supported under existing conditions. Enhancement activities would focus on removal of vegetation encroaching into open water areas and decreasing vegetation density. Dredging would be used to minimize the potential for vegetation to expand back into open water areas and to remove nutrient-rich sediments from the lagoon.

Under this alternative, three deep areas, approximately 9 feet deep, would be dredged to function as fishing areas within the lagoon. One fishing area would be located within the southwestern portion of the Coast Highway Basin and would be accessed from Maxton Brown Park or the Boardwalk. The second fishing area would be located in the northern part of the Railroad Basin off Coast Highway and would be accessed from Carlsbad Boulevard via a trail extending through the currently vacant lot north of the lagoon (it is anticipated that this vacant lot would be acquired as part of the Enhancement Project). The third fishing area would be located in the eastern portion of the I-5 Basin and would supplement the existing fishing location near Lagoon View Drive and Jefferson Street. The public use of these fishing areas would be subject to designation by CDFW as authorized shoreline fishing locations.

Habitat Distribution

The range of habitats within the lagoon under the Freshwater Alternative would remain similar to the existing habitats; however, the proportion of vegetation to open water and distribution would shift. Encroaching freshwater marsh, primarily cattails, would be removed and open water areas dredged to remove historic sediment accumulation and nutrient load, and minimize future vegetation encroachment into open water areas. The three existing islands of coastal salt marsh located in the I-5 Basin would be preserved under the Freshwater Alternative, along with the deep, open water area located just downstream from Jefferson Street bridge, which acts as a sediment trap for fluvial runoff into the lagoon.

Under the Freshwater Alternative, much of the existing freshwater marsh would be left in place to maintain habitat for some of the rare, threatened, and endangered species that use the lagoon, such as the light-footed Ridgway's rail (*Rallus obsoletus levipes*) (formerly the light-footed clapper rail; Chesser et al. 2014) and Clark's marsh wren (*Cistothorus palustris clarkae*). Vegetation removal would occur adjacent to roadways/railways to minimize the risk of special-status species moving onto roadways/railways, thereby reducing the likelihood of injury or death to these species. Vegetation would also be removed from central portions of basins to enhance localized circulation and allow better access for vector control efforts. Freshwater marsh left intact would be managed in specific areas with large patch size to minimize vectors in the future.

Channel and Infrastructure Improvements

Under the Freshwater Alternative, the existing 50-foot weir at the ocean outlet would be replaced with a wider, 80-foot weir to improve flood performance. The new weir structure would have the same elevation as the existing weir of +5.6 feet NGVD. The new weir would be built in the same location as the existing weir and would be constructed of concrete and wood. Similar to existing conditions, the weir would continue to retain freshwater in the lagoon by limiting discharges to the ocean only when the lagoon water level exceeds the weir elevation and the beach berm is not higher than that elevation.

Under the Freshwater Alternative, the railroad bridge would be improved as part of the LOSSAN corridor improvements and the I-5 bridge would be replaced as part of the North Coast Corridor Project. The channel extending under I-5 would remain at the existing dimensions. The bridge spanning the channel would be constructed by Caltrans to allow future widening of the channel under the bridge. However, no channel widening would be done as a part of this project. The Carlsbad Boulevard bridge would remain in place since no additional expansion of the underlying channel would be required as part of the Freshwater Alternative. Accumulated sediment and vegetation would be removed to return the channel to the original design dimensions; no additional protection would be placed within the channel at this crossing.

Materials Removal and Periodic Maintenance

Although much of the existing vegetation under the Freshwater Alternative would remain in place, approximately 129,000 cubic yards (cy) of vegetation (e.g., cattails) would be removed and hauled off-site for disposal ~~in a landfill~~ at a green waste facility, as identified in Table ES-3.

Under this alternative, portions of the lagoon would be dredged to provide water depths that would preclude cattail growth and expansion. Depending on the characteristics of the dredged material, it would be used beneficially as a source of beach material or disposed of as waste on-site or off-site. Approximately 562,000 cy of sediment would be removed from the lagoon to achieve the proposed habitat distribution for the Freshwater Alternative. The final grade elevations are based on a 4-foot minimum water depth designed to preclude the growth of cattails.

Maintenance under the Freshwater Alternative would be focused on management of remaining cattail and freshwater marsh areas. It is anticipated that, as part of the adaptive management strategy to maintain cattails yet allow effective vector control, vegetation thinning through the establishment or maintenance of channels through dense cattail areas would be conducted. It is anticipated that such thinning would occur approximately every 1 to 2 years. As development

continues in the watershed, sedimentation into the lagoon is anticipated to continue to decrease, reducing the accumulation of sediment in the future in open water areas. Sediment removal is anticipated to occur every 25 years on average to maintain open water areas and hydraulic capacity of the lagoon, but sediment rates and patterns are difficult to predict in the watershed and that frequency is speculative. A large amount of sediment accrual could take place due to storm events, the frequency and severity of which are highly variable and difficult to predict. Therefore, the Enhancement Project does not assume additional sediment removal as part of this environmental analysis. Future environmental review would be required prior to sediment removal under the Freshwater Alternative.

Saltwater Alternative

Under the Saltwater Alternative, the hydrologic regime of the lagoon would be changed from the existing freshwater system to a saltwater system influenced primarily by saltwater entering the lagoon from an open tidal inlet during flood tides, as well as freshwater entering the lagoon from upstream and along the boundary of the lagoon. Water exiting the lagoon under the Saltwater Alternative would primarily occur during ebb (outgoing) tides, with evapotranspiration and seepage providing additional output.

Similar to the Freshwater Alternative, the Saltwater Alternative would incorporate deeper subtidal fish areas designed to encourage saltwater fish presence in the lagoon. Two subtidal areas would be created under the Saltwater Alternative. The first fishing area would be located in the northern part of the Railroad Basin off Coast Highway and the second would be located in the eastern portion of the I-5 Basin and would supplement the existing fishing location near Lagoon View Drive and Jefferson Street. The public use of these fishing areas would be subject to designation by CDFW as authorized shoreline fishing locations.

Habitat Distribution

As this alternative would result in a conversion of the hydrologic regime of the lagoon, the habitat would also be converted from that of a freshwater system to that of a saltwater system. Existing vegetation within the construction disturbance limits would be removed and hauled off-site for disposal ~~in a landfill~~ at a green waste facility. Areas of freshwater vegetation outside the construction disturbance limits would be allowed to transition naturally. These areas would be monitored and adaptively managed to facilitate transition to a salt marsh habitat over time.

The range of habitats within the lagoon, including habitats occupied by threatened and endangered species, would be substantially modified under this alternative, as summarized in Table ES-1. Existing freshwater marsh and open water areas would be replaced with coastal salt

marsh and open saline water areas. The Saltwater Alternative would feature a subtidal, open water channel running from the ocean (tidal inlet) to approximately halfway through the I-5 Basin. On either side of the channel, the ground would be graded to provide intertidal mudflat and a mix of coastal salt marsh habitats (low, mid, and high salt marsh) within each of the four basins. This distribution of habitats would provide habitat for some of the rare, threatened, and endangered species that currently use the lagoon, as well as support additional species that do not use the lagoon under existing conditions. Similar to the Freshwater Alternative, the three existing islands located in the I-5 Basin would be preserved, along with the sediment trap located just downstream from the Jefferson Street bridge. This trap would also function as a subtidal fish area.

Planting would be conducted, as necessary, to supplement the natural processes-driven recruitment that is expected to occur after project completion and subsequent exposure to ocean water via tidal exchange.

Channel and Infrastructure Improvements

Under this alternative, the existing 50-foot weir at the ocean outlet would be removed and replaced with an open tidal inlet to provide tidal exchange while improving flood performance. The tidal inlet would have a maximum width of 100 feet at an elevation of +4.0 feet NGVD and an initial bottom (invert) elevation of -2.0 feet NGVD. The inlet would be confined on the northern side by the existing stone revetment running along the St. Malo complex, although improvements may be required depending on the integrity of the existing revetment. On the southern side, the inlet would be confined by the construction of a stabilized channel running from inside the Weir Basin seaward to the shoreline position established by the St. Malo revetment to the north. Although still in the design phase, it is anticipated that the structural toe (bottom) of the channel structure would be between -5 feet NGVD to -10 feet NGVD and the crest (top) would extend no higher than +6.0 feet NGVD. The channel would likely be constructed of stone.

Under the Saltwater Alternative, the railroad bridge would be improved as part of the LOSSAN corridor improvements and the I-5 bridge would be replaced as part of the North Coast Corridor Project. The channel extending under I-5 would be expanded to 160 feet, and the bridge would be constructed by Caltrans to span the larger channel. Slope protection for this structure would be designed and placed as part of the Caltrans improvements along I-5. The channel extending under Carlsbad Boulevard and the bridge spanning the channel would be expanded to 110 feet and replaced as part of the Saltwater Alternative. The expanded channel may require slope protection to prevent scour of the bridge abutments and embankments. It is anticipated that stone

revetment would extend up to 300 feet from the channel to the north and south on both the eastern and western sides of the embankment.

Materials Removal and Periodic Maintenance

Under the Saltwater Alternative, large portions of the lagoon would be dredged to provide ground elevations suitable to support tidal wetlands. Approximately 211,000 cy of vegetation (e.g., cattails) would be removed from the lagoon, as described in Table ES-3.

Approximately 781,000 cy of sediment would be removed from the lagoon to achieve the proposed habitat distribution for the Saltwater Alternative. The final grade elevations are based on the inundation frequency range associated with each coastal salt marsh habitat type. Depending on the characteristics of the dredged material, it would be used beneficially as a source of beach material or disposed of as waste on-site or off-site.

Periodic maintenance of the Saltwater Alternative would involve sediment removal during inlet maintenance. Sediment, primarily sand, would be captured in the inlet created under the Saltwater Alternative, and would require removal on a consistent basis to maintain the tidal exchange between the lagoon and ocean. Up to 27,000 cy of material would be removed from the inlet using land-based equipment, and placed on the north end of the North Carlsbad Beach placement site. Sand would be spread on the beach using bulldozers. It is anticipated that inlet maintenance could take between 2 to 4 weeks to complete, and could occur every 12 to 20 months.

Hybrid Alternative

Under the Hybrid Alternative, the hydrologic regime of the lagoon would be changed from the existing freshwater system to a hybrid system influenced by both saltwater and freshwater, with a saltwater system created west of I-5 and a freshwater system maintained east of I-5. The hydrologic system west of I-5 would be influenced primarily by saltwater entering the system from an open tidal inlet during flood tides, as well as freshwater entering the lagoon just downstream from I-5 and along the boundary of the lagoon. Under the Hybrid Alternative, water would exit the lagoon primarily during ebb tides with evapotranspiration and seepage providing additional output. The hydrologic system east of I-5 would be controlled primarily by freshwater entering the system from upstream and along the boundary of the lagoon, and outputs via evapotranspiration and seepage, or overflow at the weir to be located under I-5. Creation of three deep water habitat areas in the lagoon, approximately 5 acres and similar in location to those described for the Freshwater Alternative, would also occur under the Hybrid Alternative.

There are two design options under the Hybrid Alternative (Options A and B) differentiated by work within the Weir Basin and future maintenance requirements. Under Hybrid Alternative, Option A, a channel would be constructed to connect the tidal inlet from the ocean area through the Weir Basin and into the Railroad Basin. Hybrid Alternative, Option B would achieve tidal exchange in the same manner as the Saltwater Alternative with an open tidal inlet connecting the ocean to the Weir Basin. The channel constructed under Hybrid Alternative, Option A would result in a perched water level within the Weir Basin that would have a substantially muted tide range compared to Hybrid Alternative, Option B. In addition, this feature would allow littoral sediment (sand) to bypass the Weir Basin and enter the Railroad Basin where some of the sediment would settle to the bottom.

Habitat Distribution

The range of habitats within the lagoon under the Hybrid Alternative would be substantially modified, with the existing freshwater marsh and open water areas replaced with open freshwater marsh and fringing habitats east of I-5, and coastal salt marsh and open saline water areas west of I-5. The Hybrid Alternative would feature a subtidal, open water channel running from the ocean (tidal inlet) through the Coast Highway Basin. On either side of the channel, the ground would be graded to provide intertidal mudflat and a mix of coastal salt marsh habitats (low, mid, and high salt marsh) within the Railroad and Coast Highway Basins. This mix of habitats would provide habitat for some of the rare, threatened, and endangered species that currently use the lagoon, as well as support additional species that do not use the lagoon under existing conditions. Existing freshwater vegetation within the construction disturbance limits would be removed and hauled off-site for disposal in a ~~landfill~~green waste facility from portions of the lagoon identified as transitioning to saltwater conditions (e.g., west of I-5). Freshwater vegetation outside the construction disturbance limits within proposed saltwater portions of the lagoon would be allowed to transition naturally. These areas would be monitored and adaptively managed to facilitate transition to salt marsh habitat over time. As with the Freshwater and Saltwater Alternatives, the three existing coastal salt marsh islands currently located in the I-5 Basin would be preserved, along with the sediment trap located just downstream from the Jefferson Street bridge, which would be designed to function as a fishing area.

Planting would be conducted, as necessary, to supplement the natural processes-driven recruitment expected to occur in the area west of the I-5 after project completion and subsequent exposure to ocean water via tidal exchange.

Channel and Infrastructure Improvements

Similar to the Saltwater Alternative, the existing 50-foot weir at the ocean outlet would be removed under this alternative and replaced with an open tidal inlet to provide tidal exchange to the portion of the lagoon west of I-5 while also improving flood performance. The tidal inlet would have a maximum width of 100 feet at an elevation of +4.0 feet NGVD and an initial bottom (invert) elevation of -2.0 feet NGVD. The inlet would be confined on the northern side by the existing stone revetment running along the St. Malo complex, although improvements may be required depending on the integrity of the existing revetment. On the southern side, the inlet would be confined by the construction of a channel structure running from inside the Weir Basin seaward to the shoreline position established by the St. Malo revetment to the north. Although still in the design phase, it is anticipated that the structural toe (bottom) of the channel would be between -5 feet NGVD to –10 feet NGVD and the crest (top) would extend no higher than +6.0 feet NGVD. The channel structure would likely be constructed of stone.

Under the Hybrid Alternative (Options A and B), the railroad bridge would be improved as part of the LOSSAN corridor improvements and the I-5 bridge would be replaced as part of the I-5 North Coast Corridor Project. The channel extending under I-5 would remain at the existing width, and the bridge spanning it would be constructed by Caltrans to allow widening of the channel in the future as needed but the channel would not be widened as part of the Enhancement Project. Additionally, the Hybrid Alternative would include construction of a new water control structure (weir) at the I-5 bridge to maintain a freshwater hydrologic regime in the portion of the lagoon east of I-5. The new weir at this location would have the same invert elevation as the existing weir in the Weir Basin (+5.6 feet NGVD) and the same top width as the existing channel under the I-5 bridge (36 feet). The new structure at the I-5 bridge would be constructed of concrete, stone, and/or wood. Maintenance access to this structure would be provided via the I-5 roadway embankment to the south and north. Additionally, as described above, the channel guide constructed under the Hybrid Alternative, Option A would result in a perched water level within the Weir Basin. This channel guide would be constructed of rock with an armor layer.

The channel extending under Carlsbad Boulevard and the bridge spanning the channel would be expanded to 110 feet and replaced as part of the Hybrid Alternative under both options. The expanded channel may require slope protection to prevent scour of the bridge abutments and embankments. It is anticipated that stone revetment would extend up to 300 feet from the channel to the north and south on both the eastern and western sides of the embankment.

Materials Removal and Periodic Maintenance

Under the Hybrid Alternative, a portion of the I-5 Basin would be dredged to provide water depths that would preclude cattail growth and expansion. The portion of the lagoon west of I-5 would be dredged to provide ground elevations suitable for tidal wetlands. Approximately 148,500 cy of vegetation (e.g., cattails) would be removed from the lagoon, as identified in Table ES-3.

Approximately 833,000 cy of sediment would be removed from the lagoon to achieve the proposed habitat distribution for the Hybrid Alternative. The final grade elevations are based on the inundation frequency range associated with each coastal salt marsh habitat type. Depending on the characteristics of the dredged material, it would be used beneficially as a source of beach or nearshore material or disposed of as waste on-site or off-site.

Periodic maintenance of the Hybrid Alternative would include both sediment removal during inlet maintenance, similar to the Saltwater Alternative, and management of remaining cattail and freshwater marsh areas in the I-5 Basin, similar to the Freshwater Alternative. Up to 27,000 cy of material would be entrained in the inlet created under the Hybrid Alternative that would require removal using land-based equipment and placed on the north end of the North Carlsbad Beach placement site. Sand would be spread on the beach using bulldozers. It is anticipated that inlet maintenance could take between 2 to 4 weeks to complete, and could occur every 12 to 20 months. Within the I-5 Basin, areas of freshwater marsh would remain after enhancement. It is anticipated that, as part of the adaptive management strategy to maintain cattails yet allow effective vector control, vegetation thinning through the establishment of channels through dense cattail areas would be conducted. Thinning would occur approximately every 1 to 2 years.

No Project Alternative

According to the CEQA Guidelines Section 15126.6(e)(3)(b), the No Project Alternative is defined as the "circumstance under which the proposed project does not proceed." The impacts of the No Project Alternative will be analyzed "by projecting what would reasonably be expected to occur in the foreseeable future if the proposed project were not approved, based on the current plans and consistent with available infrastructure and community services." The purpose of describing and analyzing the No Project Alternative is "to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." Under the No Project Alternative, the proposed enhancement of the lagoon would not be completed at the project site. The existing weir would remain in place. No removal of sediment or vegetation would occur, and no maintenance regime would be implemented to enhance the biological and hydrological functions or recreational values of the lagoon.

Additionally, improvements such as the Boardwalk would not be constructed as part of the No Project Alternative, although the Boardwalk could be implemented as an independent project. Replacement and expansion of the Carlsbad Boulevard bridge would not occur under the No Project Alternative. However, as the I-5 improvements (e.g., bridge replacement and I-5/SR 78 interchange) and LOSSAN improvements are not part of the Enhancement Project, it is assumed that these projects would be constructed under the No Project Alternative.

It is anticipated that the biological, water quality, and hydrological functions of the lagoon would continue to degrade under the No Project Alternative as the lagoon continues to experience sedimentation and expansion of vegetation. As vegetation expands into currently open water areas of the lagoon, it is anticipated that water circulation would further decrease, leading to additional water quality issues within the lagoon. Flooding would also be anticipated to increase as open water areas and channels are filled in with sediment and vegetation. Species that currently utilize the open water areas would be restricted to smaller areas as vegetation expands into the lagoon basins, while the biological value of the freshwater marsh vegetation would continue to decrease as it becomes more monotypical, density increases, and access to nearby open water decreases. Vector concerns due to lack of water circulation, which increases breeding potential for vectors, and the density of vegetation in the lagoon, which decreases treatment effectiveness, would continue to increase under the No Project Alternative.

ES.5.3 MATERIALS DISPOSAL/REUSE

Vegetation and soil removal from the lagoon are the major construction activities associated with the Enhancement Project. Depending on the alternative, implementation of the Enhancement Project would involve the removal and subsequent disposal of approximately 128,600 cy to 211,000 cy of vegetation (mostly cattails). In addition, the Enhancement Project would require the net excavation (cut) of approximately 562,000 cy to 833,000 cy of sediment from the four basins.

Vegetation

The Enhancement Project would involve the removal and disposal of a substantial volume of vegetation. Approximately 129,000 cy of vegetation would be removed from the four basins under the Freshwater Alternative; 211,000 cy of vegetation under the Saltwater Alternative; and 148,500 cy of vegetation under the Hybrid Alternative. Construction equipment would be used to remove vegetation, which would be disposed of at the closest facility that accepts green waste (e.g., Sycamore Landfill).

The distribution of the vegetation removal between the four basins for each alternative is presented in Table ES-4.

Table ES-4
Volume of Vegetation to Be Removed by Basin under Each Alternative

Alternative	Volume of Vegetation to Be Removed (cy) by Basin				Total
	Weir	Railroad	Coast Highway	I-5	
Freshwater	500	9,500	89,500	29,500	**129,000**
Saltwater	1,500	14,000	103,500	92,000	**211,000**
Hybrid	1,500	14,000	103,500	29,500	**148,500**

Sediment

Construction of the Enhancement Project would require the net excavation of approximately 562,000 cy of sediment from the four basins under the Freshwater Alternative; 781,000 cy of sediment under the Saltwater Alternative; and 833,000 cy of sediment under the Hybrid Alternative (both options). The distribution of earthwork between the four basins for each alternative is presented in Table ES-5.

Table ES-5
Earthwork Volume by Basin under Each Alternative

Alternative	Earthwork Volume (cy) by Basin				Total
	Weir	Railroad	Coast Highway	I-5	
Freshwater	21,000	62,500	290,500	188,000	**562,000**
Saltwater	67,000	101,000	292,500	320,500	**781,000**
Hybrid	61,500	95,500	488,000	188,000	**833,000**

Possible disposal options have been identified based on preliminary sediment characterization data regarding the content of sand in lagoon sediments. Sediment disposal and reuse options are outlined based on typical suitability requirements for reuse within the littoral zone (i.e., on the beach or in the nearshore). Sediment with a sand content higher than 80 percent would be suitable for beneficial use as beach placement, and sediment with a sand content between 70 percent and 80 percent would be suitable for beneficial use as nearshore placement. It is assumed that sediment with less than 70 percent sand content would not be suitable for placement within the littoral zone and would require disposal at an offshore disposal or in-lagoon disposal site. Figure ES-6 outlines the offshore material placement sites under consideration.

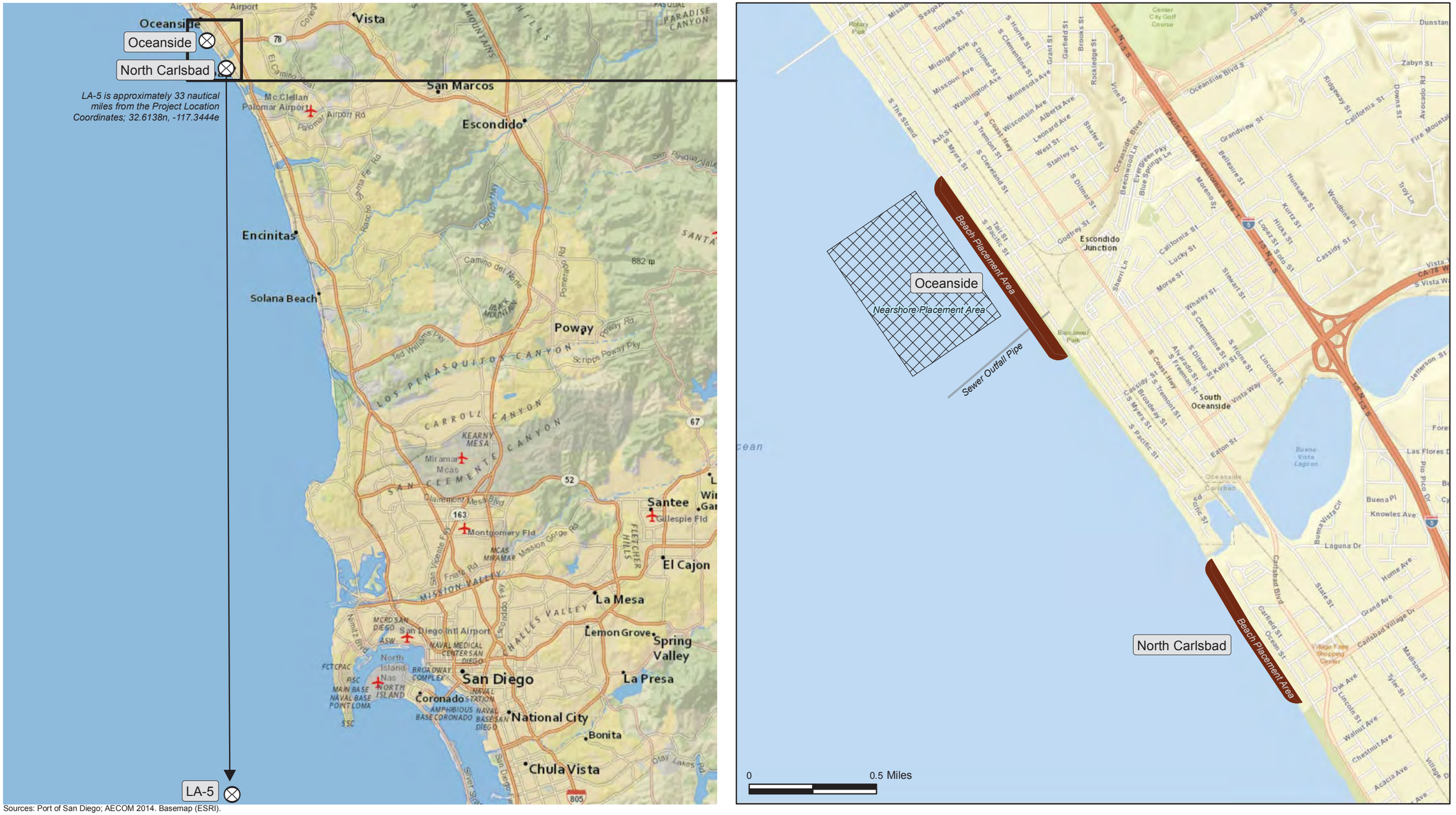
Based on previous material characterization studies (Everest and Battelle 2003; SAIC 2008a), the sand contents for each basin at different depths were estimated and are summarized in Table ES-6. As shown in Table ES-6, most of the material from the two downstream basins (i.e., Weir and Railroad Basins) is suitable to be placed on the beach or in the nearshore. In the Coast Highway Basin, sediment below 4 feet is suitable to be placed on the beach or in the nearshore. None of the sediment within the I-5 Basin would be suitable for beach or nearshore placement. It should be noted that the previous sediment characterization studies were based on composite samples of a few locations so further soil characterization investigations during future phases of the project would provide more precise soil characterization estimates.

Table ES-6
Estimated Sand Content Percentage by Basin

Depth (feet)	Weir Basin	Railroad Basin	Coast Highway Basin	I-5 Basin
	Estimated Sand Content (%) for 2-foot Lifts			
0 - 1	74	65	37	12
1 - 2				
2 - 3	82	80	62	23
3 - 4				
4 - 5	78	88	81	34
5 - 6				
6 - 7	96	84	80	35
7 - 8				
8 - 9	98	84	78	44
9 - 10				
10 - 11	99	84	77	53
11 - 12				
12 - 13	99	84	77	53
13 - 14				
14 - 15	99	84	77	53
15 - 16				
16 - 17	99	84	77	53
17 - 18				
18 - 19	99	84	77	53
19 - 20				

Yellow denotes sand content > 80% – suitable for reuse; beach placement.
Blue denotes sand content between 70%–80% - suitable for reuse; nearshore placement.
Grey denotes sand content < 70% – not suitable for reuse; disposal required.

As the sediment characterization is preliminary and it is possible that different volumes of material could be identified as project implementation occurs, a range of sediment reuse/disposal options have been analyzed as part of the Enhancement Project. Potential littoral cell reuse is



Sources: Port of San Diego; AECOM 2014. Basemap (ESRI).

5 2.5 0 5 Miles

Scale: 1:316,800; 1 inch = 5 miles

Figure ES-6
Potential Offsite Materials Placement Sites

Path: P:\2013\60288954_BVLEP_EIR\06GIS\6.3_Layout\Reports\ExecutiveSummary\SandPlacement_Overview.mxd, 7/1/2015, lauren_rizzo

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proposed as one of these options. Volumes analyzed for placement at these sites total more than the anticipated disposal needs of the project to provide flexibility in the event additional suitable material is identified during construction.

As previously discussed, specific locations have been carried forward for potential materials disposal/reuse based on historic project site boundaries, including sites used during the 2012 RBSP implemented by SANDAG (SCH No. 2010051063) and the Final Environmental Impact Statement for the Development of Facilities in San Diego/Coronado to Support the Homeporting of One NIMITZ Class Aircraft Carrier (Navy Homeporting EIS). The latest SANDAG RBSP included two nearby beach locations—Oceanside and North Carlsbad. These sites, due to their proximity to the project site and their capacity for materials placement (based on previously permitted projects), are determined as suitable for materials placement for the Enhancement Project. Previous approval to place material on these sites was for single use under these previous environmental documents. Therefore, the Enhancement Project includes placement of material at these sites as a project component and this EIR includes an evaluation of potential impacts associated with that placement. A matrix describing each of the materials disposal/reuse scenarios and maximum capacity per site is provided in Table ES-7. Under each of the alternatives, a combination of different strategies could be implemented based on sediment characteristics. Specific volumes anticipated for placement are included in Table ES-7 for reference, but the analysis in this EIR is based on placement of the total sand capacity at each site. The scenarios described and analyzed in this EIR therefore represent a "worst-case" scenario and reflect a maximum volume that could be placed at each location. The total capacity at the sites exceeds the amount of material needed to be disposed/reused for the construction of the Enhancement Project. Thus, only a portion of these disposal/reuse sites, or a portion of the volume (and footprints) identified may actually be used for materials placement under each alternative. Based on preliminary sediment characterization information, all sediment generated as part of the initial construction effort is anticipated to be placed within the Oceanside beach or nearshore sites. No placement at Carlsbad is anticipated during construction, although the site could provide additional capacity if suitable material is identified prior to construction. This site would be used for placement of material excavated during periodic inlet maintenance of the Saltwater and Hybrid Alternatives. The likely scenario is construction placement in Oceanside (beach and nearshore) and routine post-project maintenance at North Carlsbad.

Table ES-7
Materials Disposal and Reuse Scenarios

Construction Approach	Capacity Based on Historical Projects	Alternative		
		Freshwater	Saltwater	Hybrid
		Disposal Need: 562,000 cy	Disposal Need: 781,000 cy	Disposal Need: 833,000 cy
Approach 1 – Without an Overdredge Pit				
Beach				
Oceanside	420,000	49,000	110,000	129,500
North Carlsbad	225,000	0	0	0
Nearshore				
Oceanside	2,460,000	30,000	49,000	51,000
LA-5	N/A	483,000	622,000	652,500
Approach 2 – With an Overdredge Pit				
Beach				
Oceanside	420,000	175,000	232,500	255,000
North Carlsbad	225,000	0	0	0
Nearshore				
Oceanside	2,460,000	387,000	548,500	578,000
LA-5	N/A	0	0	0

cy = cubic yards

Notes:

1. Materials placement quantities exceed amount to be disposed of, or reused, to allow flexibility at individual placement sites. The North Carlsbad site is not anticipated to be used as part of the initial construction placement, but could provide additional capacity in the event more suitable material is identified during construction. In addition, the North Carlsbad site is proposed to be used for placement of material removed during periodic inlet maintenance required as part of the Saltwater and Hybrid Alternatives.
2. Onshore beach sand placement sites are consistent with the 2012 RBSP (SCH No. 2010051063). While 2012 RBSP sites are proposed for use, the Enhancement Project would obtain permits for placement.
3. The nearshore placement site is consistent with the Oceanside nearshore beach replenishment site H identified in the Final Environmental Impact Statement for the Development of Facilities in San Diego/Coronado to Support the Homeporting of One NIMITZ Class Aircraft Carrier (Navy Homeporting EIS). While Site H is proposed for use, the Enhancement Project would obtain permits for placement.
4. Sand Compatibility and Opportunistic Use Programs (SCOUP) sites are not included as an option for materials placement in this EIR because the existing SCOUPs assume construction methods and other conditions that are not consistent with the Enhancement Project (e.g., daytime construction only).
5. LA-5 is an existing EPA-designated ocean disposal site located approximately 10 nautical miles offshore, southwest of San Diego Bay. This site can be used for the disposal of dredged material from federal projects. The project must establish that the dredged material would not exceed the capacity of the site and confirm that the material is in compliance with the EPA and Corps criteria and regulations prior to approval to dispose of material by EPA and the Corps (EPA 1987). Preliminary testing of materials indicates that the material would be suitable for disposal at LA-5, but authorization would be required prior to construction.

As outlined in Table ES-7, two different construction approaches could be used for implementation of the Enhancement Project. One method, identified under Approach 1, would dredge materials in areas designated for grading to lower elevation and dispose of those dredged materials on nearby beach, the nearshore, or offshore, based on their characteristics (e.g., proportion of sand and grain size). Approach 2 would construct an overdredge pit to provide capacity for on-site disposal of fine-grained material and generate material that could be reused within the littoral zone, on the beach, or in the nearshore. The overdredge pit would be located in an area of the lagoon that contains high proportions of sand at depth, which would be

placed on the beach and nearshore sites as the pit is excavated. That pit would then be backfilled with finer-grained materials that would otherwise need to be disposed of at LA-5. As a result, finer-grained materials would be encapsulated on-site and no off-site disposal would be required under Approach 2. Approach 1 assumes an overdredge pit would not be built within Buena Vista Lagoon, and no on-site retention of fine-grained material would occur. Under Approach 1, any fine-grained material would be disposed of at LA-5, and less material would be generated that could be reused on the beach or in the nearshore, as identified in Table ES-7.

Inlet maintenance required under the Saltwater and Hybrid Alternatives would also result in materials requiring disposal, but material removed from the inlet is anticipated to be sandy and disposed of on the adjacent beach at North Carlsbad. This materials placement would occur annually and is evaluated as part of maintenance, as described in Section 2.9.3. Anticipated maintenance volumes of 27,000 cubic yards would be placed annually on Carlsbad beach south of the inlet. That amount is addressed separately and is not included in the totals in Table ES-7, which focuses on the one-time beneficial use and disposal needs associated with initial project implementation. To provide full public disclosure and maximum flexibility during construction, all disposal/reuse scenarios are evaluated in this EIR. To facilitate identification of potential impacts associated with placement of material due to sediment disposal/reuse, materials disposal/reuse scenarios are evaluated independently throughout the document.

ES.6 CONSTRUCTION METHODS, SCHEDULE, AND DESIGN FEATURES

Project construction would primarily involve removing vegetation and lowering existing ground elevations in the four basins to create the various habitat distributions for each of the enhancement alternatives. The construction methods for the Enhancement Project were developed based on project requirements and site constraints, as well as experience with similar previous projects.

The timing and phasing of the various construction activities are important considerations in project planning. In general, the first step in the sequence of construction work would be to mobilize equipment to the project site, develop access to the construction areas, and prepare staging areas. The staging areas would be cleared, grubbed, and surfaced, as needed, to support construction equipment and materials. Vegetation removal would be completed next, moving from one basin to another, with work starting at the I-5 Basin and moving downstream until reaching the Weir Basin. After vegetation removal, dredging work would be undertaken, starting in the Coast Highway Basin and moving to the I-5 Basin, with the Railroad and Weir Basins completed last. The weir/inlet work would be conducted next, and the lagoon would be opened (under Saltwater Alternative and Hybrid Alternative only) once this work is complete. Planting of the vegetated areas would begin after the earthwork is complete and final elevations have been

verified in the field but prior to opening of the lagoon to tidal exchange (as appropriate). After planting is completed, the demobilization of all construction equipment and materials would commence. Demobilization would include the restoration of staging and access areas to agreed-upon post-construction conditions (e.g., pre-construction conditions). The construction methodology and phasing ultimately used would be determined by the contractor selected for construction with due consideration to the requirements specified in permits, agreements, and approval documents. If the selected contractor chooses a construction methodology that is substantially different than what is presented herein, additional environmental review may be needed to verify that the project would not result in substantial environmental impacts beyond those identified and considered in this EIR.

It is expected that the contractor would generally follow daily time restrictions for construction operation set by the Cities of Carlsbad and Oceanside. Based on these restrictions, it is anticipated that construction would start at 7 a.m. and end at 6 p.m., Monday through Friday, although these time constraints may vary. The exception to this is dredging and sand placement operations, which could continue up to 24 hours a day/7 days a week due to issues associated with starting and stopping these activities (e.g., sand settlement in pipelines that then require resuspension, adding to the potential for pipeline clogs).

Mobilization of construction equipment and material is expected to take 1 to 2 months to complete. It is estimated that the vegetation removal operation would take 2 to 3 months to complete. Given the nature of this work, vegetation removal could be disruptive to wildlife and would occur between October 1 and February 14, outside the nesting season (February 15 through September 30). Dredging within the lagoon is anticipated to take 12 to 24 months to complete. The dredging operation would be limited in area to the immediate vicinity of the dredge and sediment discharge locations (beach, nearshore, offshore, and within the lagoon). Restricting all construction to outside of the nesting season would substantially increase the construction schedule and would double the time needed to restore the lagoon. Therefore, given the limited area and nature of this work, it is expected that the dredging operation would take place throughout the year with no shutdown during the nesting season. Construction of the Boardwalk and replacement of the Carlsbad Boulevard bridge (depending on alternative) would occur concurrent with dredging operations. Demobilization of construction equipment and material is expected to take 1 to 2 months to complete. It is estimated that the entire construction program would take 15 months to 30 months to complete.

ES.6.1 GENERAL CONSTRUCTION FEATURES

Construction in a lagoon environment is challenging and can be complex. Several methods are typically required to coordinate working with dredges over water and earthmoving equipment

over land. Often a combination of approaches is utilized, particularly in a large site such as Buena Vista Lagoon.

Generally, construction would consist of:

1. Removal of vegetation (primarily cattails) and drying for off-site transport and disposal.
2. Dredging and grading within the lagoon to raise or lower elevations to create a diverse mix of habitats.
3. Disposal of sediments excavated from the lagoon to different locations, as identified for materials disposal/reuse, including nearshore areas, nearby beaches, and/or on-site placement. One construction approach would allow for construction of an overdredge pit within the lagoon to provide on-site disposal of fine material. This approach would also generate material that could be beneficially reused in the littoral system.
4. Infrastructure improvements and protection, as necessary, including replacement of the Carlsbad Boulevard bridge (under the Saltwater and Hybrid Alternatives only).
5. Revegetation of graded areas within the lagoon to facilitate recovery of habitat.
6. Periodic maintenance of inlet sedimentation (under the Saltwater and Hybrid Alternatives only) and vegetation (e.g., vector management areas).
7. Monitoring and adaptive management activities to maintain ecological functions of the lagoon.

Prior to construction, a detailed construction phasing plan would be developed for the chosen alternative. Throughout construction standard construction practices, established to maintain public and contractor safety and enforce equipment operational requirements during project construction, would be followed by the contractor. Table ES-8 lists some of the standard construction practices that have been incorporated into the Enhancement Project.

Table ES-8
Standard Construction Practices

• Implement a public information program to assist nearby residents in understanding the purpose of the project and disseminate pertinent project information, including a project website with current construction schedule.
• Coordinate with applicable agencies regarding construction and maintenance schedules and worksite traffic control plans including, but not limited to, Oceanside Fire Department, Oceanside Police Department, Carlsbad Fire Department, and Carlsbad Police Department.
• Coordinate with the utility service provider for relocating and/or avoiding utilities infrastructure.
• Notify residents at least 1 week in advance of nighttime construction work within 100 feet of residences; restrict construction work to no longer than 3 consecutive nights within 100 feet of a specific residence where sleep disturbance may occur.
• Have Resident Engineer or designee on-site during construction to confirm compliance with permit conditions and construction specifications.
• Prior to initiating construction, identify sensitive "no construction zones" and fence or flag those areas. Limit construction equipment and vehicles to within these limits of disturbance.
• Restrict access to active construction areas to maintain public safety (e.g., portions of trails, beaches within placement sites, and ocean adjacent to monobuoy and/or pipelines).
• Clearly mark pipelines used during materials transport to the nearshore site, including both floating and submerged, as "navigational hazards."
• Site staging areas and access roads at existing access points and previously disturbed areas, where feasible.
• During off working hours, secure heavy equipment and vehicles in staging area.
• Conduct equipment fueling and maintenance at designated staging and fueling areas away from publicly accessible areas.
• Maintain equipment and vehicle engines in good condition and properly tuned per manufacturers' specifications. Idling time for construction equipment will be minimized, as appropriate.
• Maintain one lane of circulation on public roadways and access to neighboring commercial establishments during project construction. Restore roadway capacity upon completion of the new Carlsbad Boulevard bridge.
• Ensure temporary speed limit reduction for the traffic detour approaches and exits conforms to safe highway design speeds.
• Have a flag person present to coordinate north-south traffic during those limited times that only a single lane is open across the Carlsbad Boulevard bridge.
• Prior to opening areas of beach with placed materials, spread the materials and check for potential hazards (e.g., foreign objects in the sand).
• Post signs advising the public of the presence of steep sand slopes (e.g., scarps) should they develop on beaches where sand is placed.
• Require heavy equipment operators to be trained in appropriate responses to accidental fires.
• Provide fire suppression equipment on board land- and aquatic-based vehicles and at the worksite.
• Provide emergency communication equipment for site personnel.
• As part of permanent erosion control, protect lagoon channel cross sections with erosion control products (i.e., riprap) and vegetated material to stabilize soils and foster natural recruitment from restoration planting, thus managing erosion during higher-velocity storm flows and preventing damage.

ES.6.2 DESIGN FEATURES

The Enhancement Project is designed to enhance the lagoon system as a whole. Due to the nature of the project, an effort has been made to proactively incorporate measures into each of the alternatives to minimize and avoid, where possible, impacts to resources. These "project design features" represent a commitment by the project proponent to construct the project in an environmentally sensitive way. Some project design features are incorporated to avoid or

minimize a potential significant impact proactively through design, but others are additional measures that support the overall enhancement objectives of the project without being tied to a specific potential impact. Many features also represent regulatory or code requirements that the project would need to comply with to be approved by various agencies and/or implemented legally. These features are committed to by the project applicant and would be implemented by the contractor or other parties before, during, and after construction. Inclusion of these project design features is considered in the determination of CEQA impact significance in Chapter 3. These project design features (PDFs) are summarized in Table ES-9 and include the purpose, timing, and responsibility for implementation of each project design feature.

ES.7 ISSUES RAISED BY THE PUBLIC AND AGENCIES

A public scoping meeting was held near the project site at Buena Vista Elementary School on May 9, 2013. The purpose of the meeting was to seek input from public agencies and the general public regarding the environmental issues and concerns that may potentially result from the Enhancement Project. More than 70 people attended the public scoping meeting. General verbal and specific written comments were accepted at this meeting. Additionally, verbal and written comments were accepted via phone, mail, and e-mail during the scoping period. A copy of the Notice of Preparation, written comments received, and a transcript of verbal comments from the public scoping meeting are included as Appendix A of the EIR.

In addition to the comments provided at the scoping meeting, approximately 150 written comment letters were received from various agencies, organizations, and individuals. Areas of known controversy include changes to existing freshwater habitat, changes to the weir (privately owned), the overall biological health of the lagoon, changes to fishing associated with changes in fish species tied to water regimes (fresh or salt), vector management, and flood control.

ES.8 SUMMARY OF ENVIRONMENTAL IMPACTS

An analysis of environmental impacts caused by the Enhancement Project has been conducted and is contained in this EIR. Fifteen environmental issue areas are analyzed in detail and presented in Chapter 3. Table ES-10 provides a summary of the potentially significant environmental impacts that would result during construction and operation of the Enhancement Project, mitigation measures that would lessen potential environmental impacts, and the level of significance of the environmental impacts that would remain after implementation of the proposed mitigation. The Enhancement Project would result in the following significant and unavoidable impacts: temporary impacts to sensitive vegetation communities, Belding's savannah sparrow, Ridgway's rail, and sensitive birds (Section 3.5); temporary visual impacts resulting from construction activities within the lagoon and permanent visual impacts resulting

Table ES-9
Project Design Features

PDF #	Design Features	Purpose	Timing	Implementation Responsibility
CARLSBAD BOULEVARD BRIDGE DESIGN FEATURES – Saltwater and Hybrid Alternatives Only				
PDF-1	Design recommendations from the San Diego Association of Governments (SANDAG) Sea Level Rise Study (SANDAG 2013) and California Coastal Commission Sea-Level Rise Policy Guidance (CCC 2015) will be incorporated into pile foundation and abutment protection engineering for bridgework.	Ensure bridge structural integrity.	Pre-construction	Project engineer
PDF-2	The replacement bridge structure along Carlsbad Boulevard will possess deep pile foundations and well-protected abutments as engineered per appropriate regulatory safety requirements. Structures will be designed in accordance with applicable local and state engineering and design standards.	Ensure bridge structural integrity and meet engineering requirements.	Pre-construction	Project engineer
PDF-3	The Carlsbad Boulevard alignment and bridge approach will conform to California Department of Transportation (Caltrans) standards for sight distance and vertical clearance.	Ensure motorist safety and meet engineering requirements.	Pre-construction	Project engineer
PDF-4	Channel and infrastructure improvements would be reviewed by SANDAG, the City of Carlsbad, and the City of Oceanside, as appropriate, prior to approval of project grading plans. Review by agencies with regulatory authority over specific structures in the lagoon (e.g. SANDAG for railroad structure protection, Caltrans for I-5 structure protection, cities of Carlsbad and Oceanside for Carlsbad Boulevard bridge replacement and pier protection) would focus on code requirements for structural and seismic safety for infrastructure improvements, and adequacy of revetment/pier protection for structures within channels.	Engineering review.	Pre-construction	SANDAG, City of Carlsbad, City of Oceanside
PDF-5	Create a temporary bicycle path on the outside lane of the open lane along Carlsbad Boulevard during bridge construction to allow continued access between the Cities of Oceanside and Carlsbad.	Bicycle access during construction.	During bridge reconstruction	Construction contractor
MATERIAL PLACEMENT ACTIVITIES				
PDF-6	Construct longitudinal training dikes at all receiver sites.	Reduce nearshore turbidity.	During beach-building	Construction contractor
PDF-7	Sand placement to avoid blocking line-of-sight at permanent lifeguard towers.	Public safety during construction.	During beach-building activities	Construction contractor, in coordination with local lifeguards

PDF #	Design Features	Purpose	Timing	Implementation Responsibility
PDF-8	Coordinate the schedule at individual materials placement sites to the extent possible to avoid major holidays and special events.	Minimize recreational conflicts.	During beach-building activities	SANDAG and construction contractor
PDF-9	Contain fill material during sand placement near storm drain outlets.	Continue proper drainage.	During beach-building activities	Construction contractor, in coordination with City Engineer
PDF-10	For disposal at LA-5, during transfer of the material, excess water would be decanted from the barge and returned via pipe back to the lagoon to minimize ocean turbidity.	Minimize ocean turbidity.	During material disposal	Construction contractor
LAGOON ENHANCEMENT ACTIVITIES				
PDF-11	Conduct cattail maintenance during daylight hours and outside the bird nesting season (February 1 through September 15).	Avoid impacts to breeding birds and sensitive species.	During cattail maintenance	SANDAG

from construction of a new bridge providing access over the new open inlet created under the Saltwater and Hybrid Alternatives (Chapter 3.9); bicycle safety and access during the construction period under the Saltwater and Hybrid Alternatives (Chapter 3.10); construction air quality emissions (Chapter 3.11); nighttime construction noise (Chapter 3.13); and public safety impacts associated with operation of the proposed open tidal inlet under the Saltwater and Hybrid Alternatives (Chapter 3.15). Significant and unavoidable impacts resulting from the No Project Alternative would include flooding conditions (Chapter 3.2); continued degradation of water quality (Chapter 3.4); continued habitat degradation (Chapter 3.5); and increased exposure to vector-borne diseases (Chapter 3.15).

The EIR identifies potentially significant impacts requiring mitigation for impacts to access across the proposed new open inlet and beach access across the pipeline for materials placement under the Saltwater and Hybrid Alternatives (Chapter 3.1); turbidity related to construction activities (Chapter 3.4); discovery of currently unknown cultural deposits during construction activities (Chapter 3.7); excavation activities in geologic materials identified as having a moderate to high paleontological resource sensitivity (Chapter 3.8); nighttime lighting during construction (Chapter 3.9); and pedestrian access during Carlsbad Boulevard bridge construction under the Saltwater and Hybrid Alternatives (Chapter 3.10). The EIR identifies less than significant impacts for the Enhancement Project for hydrology (Chapter 3.2); oceanography/coastal processes (Chapter 3.3); geology and soils (Chapter 3.6); and public services and utilities (Chapter 3.14).

ES.8.1 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires the identification of an environmentally superior alternative. The environmentally superior alternative is the alternative that would result in the least damage to the environment. If the No Project Alternative is environmentally superior, identification of a superior alternative among the other alternatives is required (CEQA Guidelines Section 15126.6[e][2]). Thus, even though the No Project Alternative would result in the fewest number of significant environmental impacts and could be considered environmentally superior for this reason, it is not considered the environmentally superior alternative for the reasons discussed below.

Table ES-10
Summary of Impacts and Mitigation Measures

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
LAND USE/RECREATION						
Enhancement Activities	There would be no impacts related to inlet construction and operation would not occur under the Freshwater Alternative.	Inconsistencies with access-related land use policies due to the restricted north-south beach accessibility that would result from the construction and operation of an open inlet under the Saltwater Alternative are considered substantial, and **impacts would be significant**. The new inlet crossing of the beach would periodically create a new safety threat to recreational users and the **impact would be significant.**	Inconsistencies with access-related land use policies due to the restricted north-south beach accessibility that would result from the construction and operation of an open inlet under the Hybrid Alternative are considered substantial, and **impacts would be significant.** The new inlet crossing of the beach would periodically create a new safety threat to recreational users and the **impact would be significant.**	Less than Significant	Saltwater and Hybrid Alternatives Only: **Land Use-1** The project proponent will construct a pedestrian bridge that spans the proposed tidal inlet at a height above the calculated high tidal and flood flows to provide north-south lateral access for beach users. Bridge construction will occur prior to opening the tidal inlet.	With implementation of Mitigation Measure Land Use-1, safe public access would be available across the proposed inlet at all times and **the impact would be reduced to less than significant** With implementation of Mitigation Measure Land Use-1, safe public access would be available across the proposed inlet at all times and **the impact would be reduced to less than significant.**
Materials Disposal/Reuse	Less than Significant	The placement of the pipeline along the beach area could restrict access for some beach users wanting to cross from the back beach area and would cause a temporary displacement of public recreation activities due to access limitations and temporary **impacts would be significant.**	The placement of the pipeline along the beach area could restrict access for some beach users wanting to cross from the back beach area and would cause a temporary displacement of public recreation activities due to access limitations and temporary **impacts would be significant.**	No Impact	Saltwater and Hybrid Alternatives Only: **Recreation-1** Pipeline segments will be covered with sand at consistent intervals to facilitate pedestrian access across the pipeline.	With implementation of Mitigation Measure Recreation-1, safe public access would be available across the proposed inlet at all times and **the impact would be reduced to less than significant.**
HYDROLOGY						
Enhancement Activities	Less than Significant	Less than Significant	Less than Significant	Flooding performance would worsen under the No Project Alternative, and **impacts to hydrology would be significant.**	No mitigation measures are required.	The flooding impact under the No Project Alternative would **remain significant.**
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
OCEANOGRAPHY/COASTAL PROCESSES						
Enhancement Activities	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
WATER AND AQUATIC SEDIMENT QUALITY						
Enhancement Activities	As the lagoon is listed as a CWA Section 303(d) impaired waterbody for sedimentation/siltation, the potential temporary turbidity impacts generated by lagoon enhancement activities would be considered **potentially significant.**	As the lagoon is listed as a CWA Section 303(d) impaired waterbody for sedimentation/siltation, the potential temporary turbidity impacts generated by lagoon enhancement activities would be considered **potentially significant.**	As the lagoon is listed as a CWA Section 303(d) impaired waterbody for sedimentation/siltation, the potential temporary turbidity impacts generated by lagoon enhancement activities would be considered **potentially significant.**	The continued degradation compared to existing conditions and the proposed Enhancement Project alternatives would result in a **significant impact to water quality.**	Freshwater, Saltwater, and Hybrid Alternatives: **Water Quality-1** Compliance with regulatory requirements intended to address turbidity impacts (e.g., Construction General Permit, Municipal Permit) shall be implemented to ensure impacts would be reduced to a less than significant level. Compliance with those permit conditions shall be monitored through the construction monitoring program and the contractor shall certify to the engineer of record that permit conditions have been completed. **Water Quality-2** Water levels shall be actively managed by using a temporary cofferdam, and/or dike, and/or dewatering in active work areas during weir replacement, and/or tidal inlet construction, and/or I 5 weir construction activities to minimize the impact of dredge-related turbidity. The contractor would ensure waters would be free of changes in turbidity that cause nuisance or adversely affect beneficial uses during construction activities.	With implementation of Mitigation Measures Water Quality-1 and Water Quality -2, **impacts would be reduced to less than significant** for the Freshwater, Saltwater, and Hybrid Alternatives. The No Project Alternative impact to water and aquatic sediment quality would **remain significant.**
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
BIOLOGICAL RESOURCES						
Enhancement Activities	Temporary, direct impacts to beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub: *Baccharis*-dominated, **are considered significant.** Temporary direct and indirect impacts to light-footed Ridgway's rail and Belding's savannah sparrow **are considered significant.** Temporary direct and indirect impacts on sensitive birds **are considered significant.** Long-term/permanent direct impacts to light-footed Ridgway's rail and sensitive birds **are considered significant.**	Temporary, direct impacts to beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub: *Baccharis*-dominated, **are considered significant.** Temporary direct and indirect impacts to light-footed Ridgway's rail and Belding's savannah sparrow **are considered significant.** Temporary direct and indirect impacts on sensitive birds **are considered significant.**	Temporary, direct impacts to beach, coastal and valley freshwater marsh, open water, coastal scrub, and Diegan coastal sage scrub: *Baccharis*-dominated, **are considered significant.** Temporary direct and indirect impacts to light-footed Ridgway's rail and Belding's savannah sparrow **are considered significant.** Temporary direct and indirect impacts on sensitive birds **are considered significant.** Long-term/permanent direct impacts to light-footed Ridgway's rail and sensitive birds **are considered significant.**	Temporary direct impacts to light-footed Ridgway's rail and Belding's savannah sparrow **are considered significant.** Temporary direct impacts on sensitive birds **are considered significant.** Long-term/permanent direct impacts to light-footed Ridgway's rail and sensitive birds **are considered significant.**	**Biological Resources-1** Prior to construction, a preconstruction survey shall be conducted to confirm the number of individual southwestern spiny rush plants and their locations within the construction footprint. Each plant, after mapping, shall be salvaged to avoid direct impacts and held at a nursery during the entirety of construction. Post construction, salvaged plants shall be replanted in habitats similar to pre-construction conditions. **Biological Resources-2** A qualified biological monitor shall flush birds by walking ahead of construction equipment prior to grading in undeveloped, terrestrial habitats suitable to support sensitive birds to help avoid mortality of bird species during construction activities. **Biological Resources-3** Vegetation grubbing and removal shall occur outside of the bird breeding season (February 1 through September 15) to avoid potential take of nesting birds. **Biological Resources-4** A qualified biologist shall prepare and implement a targeted predator control plan for light-footed Ridgway's rail and Belding's savannah sparrow. Activities would include fencing, public signage, selective vegetation removal (i.e., invasive species or native species not preferred by Belding's savannah sparrow), construction of nesting platforms, perch removal, predator trapping/control, and/or other techniques to minimize predation of the species during construction and the post-construction monitoring period. **Biological Resources-5** Lights shall be downshielded to direct the light down toward the area of work and minimize spillage or glare (same as Visual-2). **Biological Resources-6** Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers (same as Noise-1).	With the implementation of mitigation measures, temporary impacts to Ridgway's rail, Belding's savannah sparrow and sensitive birds related to mortality from increased population concentrations, and nighttime light **would become less than significant.** With the implementation of mitigation measures, long-term/permanent impacts to Ridgway's rail and sensitive species **would become less than significant.** Even with the implementation of mitigation measures, temporary impacts to sensitive vegetation communities and to Ridgway's rail from loss of habitat and indirect noise impacts **would remain significant and unavoidable.**

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
					Biological Resources-7 E0xposed engines on dredging equipment shall be housed to the greatest extent possible (same as Noise-2). **Biological Resources-8** (Freshwater and Hybrid Alternative Only) During cattail maintenance, a qualified biologist shall flush birds by walking ahead of construction equipment prior to grading in undeveloped, terrestrial habitats suitable to support Ridgway's rail to help avoid mortality.	
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
GEOLOGY AND SOILS						
Enhancement Activities	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
CULTURAL RESOURCES						
Enhancement Activities	There is the potential to encounter currently unknown cultural deposits during mobilization and use of land-based equipment for soils and/or vegetation removal in the densely vegetated stable surfaces along portions of the lagoon margins outside of staging areas. Thus, the Freshwater Alternative would have **potential significant impacts on cultural resources.**	There is the potential to encounter currently unknown cultural deposits during mobilization and use of land-based equipment for soils and/or vegetation removal in the densely vegetated stable surfaces along portions of the lagoon margins outside of staging areas. Thus, the Saltwater Alternative would have **potential significant impacts on cultural resources.**	The potential exists to encounter currently unknown cultural deposits during mobilization and use of land-based equipment for soils and/or vegetation removal in the densely vegetated stable surfaces along the lagoon margins. Thus, the Hybrid Alternative (both options) would have **potential significant impacts on cultural resources.**	No Impact	Freshwater, Saltwater, and Hybrid Alternatives: **Cultural-1** A Monitoring and Discovery Plan shall be prepared and implemented prior to the start of ground-disturbing activities for soil and vegetation removal at the lagoon margins to 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. These measures would include: • Ground-disturbing construction activity would 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 CRHR. • If the find is determined by the project archaeologist to be potentially eligible for the CRHR: o on stable surfaces, an exclusionary zone would be set up around the find and marked (e.g., lath and flagging or silt fencing). o the cultural resources principal investigator would contact SANDAG to formulate a plan for evaluation or avoidance through redesign. o dredging or mechanical ground-disturbing activities would not resume in that location until the principal investigator is notified by SANDAG that activities may resume. o If the find is discovered on state lands, California State Lands Commission (CSLC) Assistant Chief Counsel will be consulted. The final disposition of archaeological, historical and paleontological resources recovered on State lands under the jurisdiction of the CSLC will be approved by the Commission. 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 documenting the discovery and addressing regional research issues. **Cultural-2** A training session for project construction personnel shall be conducted by a qualified archaeologist prior to the start of ground-disturbing	With implementation of Mitigation Measures Cultural-1 through Cultural-4, **impacts would be reduced to less than significant**.

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
					activities for soil and vegetation removal at the lagoon margins. 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-3** Cultural resources monitoring shall be conducted during mobilization and use of land-based equipment for soil and vegetation removal along the perimeter of the lagoon. A qualified archaeological monitor and Native American representative shall be present during mechanical excavations in stable sediments with the potential for CRHR-eligible cultural resources (i.e., topsoils on stable sediments). **Cultural-4** If human remains are encountered during construction: • Work at that location shall be suspended and redirected elsewhere. • SANDAG shall be immediately notified of the discovery. • Remains shall be left in place and exclusionary fencing will be placed in a 50-foot radius around the discovery. • Under the provisions of California PRC Section 7050.5, the County Coroner shall 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 shall notify the NAHC within 24 hours. • Disposition of Native American human remains on nonfederal lands is within the jurisdiction of the NAHC. SANDAG, as lead agency for the Enhancement Project, shall initiate consultation with the NAHC. As part of the consultation process, the NAHC shall notify the most likely descendent (MLD) from the remains. No ground-disturbing work shall occur in the location of the remains until consultation between the NAHC, MLD, and SANDAG has been completed, and notification by SANDAG that construction activities may resume. • If the remains are discovered in situ, they shall be left in place and covered with weather-proof materials such as a tarp or plywood. If they are discovered in spoils, the remains shall be placed in a labeled bag and, on approval by the MLD, transported to a secure locked container. An osteologist or a forensic anthropologist shall, in consultation with the MLD, inspect fragmentary bones that are suspected to be human but cannot be identified as such in the field.	
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
PALEONTOLOGICAL RESOURCES						
Enhancement Activities	Although located in a previously disturbed area, due to the assigned resource sensitivity, excavation of the geologic materials could result in **direct, potentially significant impacts to paleontological resources.**	Excavation activities within an area containing River and/or Marine Terrace Deposits under the Saltwater Alternative could result in **direct, potentially significant impacts to paleontological resources.**	Excavation activities within an area containing River and/or Marine Terrace Deposits under the Hybrid Alternative could result in **direct, potentially significant impacts to paleontological resources.**	No Impact	Freshwater, Saltwater, and Hybrid Alternatives: **Paleo-1** If significant paleontological resources are encountered during excavation or other ground-disturbing activities within and south of the inlet containing River and/or Marine Terrace Deposits, work in the area of the discovery shall be temporarily halted and a qualified paleontologist shall be contracted to properly assess the resource(s), and develop and implement a paleontological resource monitoring and fossil recovery program. The monitoring and recovery program may include monitoring of future ground disturbance, worker training, resource assessment and recovery, proper documentation, curation, and/or other measures as deemed appropriate.	Implementation of Mitigation Measures Paleo-1 and Paleo-2 would ensure that the important scientific information associated with any discovered paleontological resources is appropriately documented and available for future use and study. By protecting and preserving the scientific value of the resources, the direct impacts to paleontological resources would be **reduced to a less than significant level** for the Freshwater, Saltwater, and Hybrid Alternatives.

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
					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 or other ground-disturbing activities into River and/or Marine Terrace Deposits occurs and monitoring is required.	
Materials Disposal/Reuse	No Impact	No Impact	No Impact	No Impact	No mitigation measures are required.	Not Applicable
VISUAL RESOURCES						
Enhancement Activities	Due to the construction activities in the natural lagoon setting that would be highly visible to the public and sensitive viewers for a substantial duration, the Enhancement Project would result in **short-term significant impacts to visual resources. during construction** The temporary presence of nighttime lighting within the lagoon would be a change from the existing nonlit night environment, and the **temporary light and glare impact would be potentially significant.**	Due to the construction activities in the natural lagoon setting that would be highly visible to the public and sensitive viewers for a substantial duration, the Enhancement Project would result in **short-term significant impacts to visual resources. during construction** The temporary presence of nighttime lighting within the lagoon would be a change from the existing nonlit night environment, and the **temporary light and glare impact would be potentially significant.** Mitigation Measure Land Use-1 would require a pedestrian bridge to be constructed for the Saltwater and Hybrid Alternatives and would result in a **long-term, significant, unmitigable visual impact.**	Due to the construction activities in the natural lagoon setting that would be highly visible to the public and sensitive viewers for a substantial duration, the Enhancement Project would result in **short-term significant impacts to visual resources. during construction** The temporary presence of nighttime lighting within the lagoon would be a change from the existing nonlit night environment, and the **temporary light and glare impact would be potentially significant.** Mitigation Measure Land Use-1 would require a pedestrian bridge to be constructed for the Saltwater and Hybrid Alternatives and would result in a **long-term, significant, unmitigable visual impact.**	Less than Significant	Freshwater, Saltwater, and Hybrid Alternatives: **Visual-1** Temporary screening shall be placed around construction areas that are secured with a chain link fence (such as staging areas) to provide visual screening of the equipment. Screening could be brown or green mesh or other similar material attached to the fencing. It would be as high as the fence itself, which would range from approximately 6 to 10 feet. **Visual-2** Lights shall be downshielded to direct the light down toward the area of work and minimize spillage or glare.	There is no additional feasible mitigation to fully mitigate this short-term impact to below a level of significance and it **would remain significant and unavoidable for each of the enhancement alternatives.** Implementation of Mitigation Measure Visual-2 would minimize lighting impacts to residential or sensitive habitat areas. By reducing the amount of light and glare in the project area, Mitigation Measure Visual-2 would reduce lighting impacts to visual resources to a **less than significant level for the Freshwater, Saltwater, and Hybrid Alternatives.** There is no feasible mitigation to reduce visual impacts from the pedestrian bridge and given the public expectation of open views in this defined open space area, both toward the ocean and from the ocean back to the lagoon, the implementation of Mitigation Measure Land Use-1 would result in **significant, unmitigable visual impacts for the Saltwater and Hybrid Alternatives.**
Materials Disposal/Reuse	Less than Significant	Temporary lighting may be required at both the placement sites and along the pipeline. **The temporary and intermittent use of night lighting for construction activities would be potentially significant.**	Temporary lighting may be required at both the placement sites and along the pipeline. **The temporary and intermittent use of night lighting for construction activities would be potentially significant.**	No Impact	Saltwater and Hybrid Alternatives: See Mitigation Measure Visual-2.	Implementation of Mitigation Measure Visual-2 would minimize lighting impacts to residential or sensitive habitat areas during materials placement and would reduce lighting impacts to visual resources to a **less than significant level for the Saltwater and Hybrid Alternatives.**

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
TRAFFIC AND CIRCULATION						
Enhancement Activities	Less than Significant	The Saltwater Alternative would result in **temporary significant impacts to bicycle facilities in the vicinity of the project area.** The Saltwater Alternative would result in t**emporary construction impacts to pedestrian facilities in the vicinity of the project area that would be significant.**	The Hybrid Alternative (Option A and Option B) would result in **temporary significant impacts to bicycle facilities in the vicinity of the project area.** The Hybrid Alternative would result in t**emporary construction impacts to pedestrian facilities in the vicinity of the project area that would be significant.**	No Impact	Saltwater and Hybrid Alternatives only: **Traffic-1** Prepare work zone traffic control plans for lane closures and related construction along Carlsbad Boulevard prior to construction. The work zone traffic control plans shall be prepared by the contractor 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, bicyclists, and pedestrians along Carlsbad Boulevard 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. **Traffic-3** Construct the Boardwalk prior to initiation of the Carlsbad Boulevard bridge replacement. Route pedestrian traffic to the Boardwalk while the Carlsbad Boulevard bridge is under construction.	There is no additional feasible mitigation to further reduce temporary direct impacts caused by the degradation of bicycle facilities associated with the construction of Carlsbad Boulevard bridge under the Saltwater Alternative and Hybrid Alternatives to less than significant. **Impacts to bicycle facilities would remain significant and unavoidable.** Implementation of Mitigation Measure Traffic-3 would provide safe pedestrian access during construction of the Carlsbad Boulevard bridge and **reduce temporary pedestrian impacts to less than significant under the Saltwater and Hybrid Alternatives.**
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
AIR QUALITY						
Enhancement Activities/ Materials Disposal/Reuse[1]	Construction-generated NO_X emissions would exceed applicable mass emission thresholds, regardless of the material disposal scenario. Therefore, construction of the Freshwater Alternative could violate an ambient air quality standard or contribute substantially to an existing violation and **impacts would be significant.** Because construction of the Enhancement Project would exceed the project-level air quality significance thresholds, the Freshwater Alternative would have a **cumulatively**	Construction-generated NO_X emissions would exceed applicable mass emission thresholds, regardless of the material disposal scenario. Therefore, construction of the Saltwater Alternative could violate an ambient air quality standard or contribute substantially to an existing violation and **impacts would be significant** Because construction of the Enhancement Project would exceed the project-level air quality significance thresholds, the Saltwater Alternative would have a **cumulatively**	Construction-generated NO_X emissions would exceed applicable mass emission thresholds, regardless of the materials disposal scenario. Therefore, construction of the Hybrid Alternative could violate an ambient air quality standard or contribute substantially to an existing violation, and **impacts would be significant.** Because construction of the Enhancement Project would exceed the project-level air quality significance thresholds, the Hybrid Alternative would have a **cumulatively**	No Impact	Freshwater, Saltwater, and Hybrid Alternatives: **Air Quality-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 4 California Emissions Standards, unless such an engine is not available for a particular item of equipment. Tier 3 engines will be allowed on a case-by-case basis when the contractor has documented that no Tier 4 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. **Air Quality-2** The following measures shall be implemented by the construction contractor and enforced by an on-site monitor to meet SDAPCD Rule 55 requirements to control fugitive dust emissions: • 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 perimeter erosion control to prevent washout of silty material onto public roads.	Implementation of Mitigation Measure Air Quality-1 would reduce emissions associated with the construction of the Freshwater Alternative (Overdredge Pit), and **this impact would be less than significant.** However, even with implementation of Mitigation Measure Air Quality-1, construction-related NO_X emissions for the Freshwater Alternative (LA-5 disposal scenario), Saltwater Alternative, and Hybrid Alternative would continue to exceed the threshold of significance, and this impact would remain **significant and unavoidable.** Mitigation Measures Air Quality-1 through Air Quality-3 would also reduce localized NO_X and PM emissions at the project site. Because residential land uses would be located adjacent to the staging areas and off-road equipment and on-road vehicles would operate in that area for the entire construction period, the Enhancement Project could expose sensitive receptors to substantial construction pollutant concentrations. No additional feasible mitigation is available to reduce this impact.

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
	considerable contribution to the region's air quality. The Freshwater Alternative could expose sensitive receptors to substantial construction pollutant concentrations, and this **impact would be significant.**	**considerable contribution to the region's air quality.** **T**he Saltwater Alternative could expose sensitive receptors to substantial construction pollutant concentrations, and this **impact would be significant.**	**considerable contribution to the region's air quality.** The Hybrid Alternative could expose sensitive receptors to substantial construction pollutant concentrations, and this **impact would be significant.**		• 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. **Air Quality-3** Minimize idling time by shutting equipment off when not in use or reducing the time of idling to no more than 3 minutes (5-minute limit is required by the state airborne toxics control measure [Title 13, sections 2449(d)(3) and 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. **Air Quality-4** Maintain construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.	**Therefore, impacts associated with construction of the Enhancement Project would remain significant and unavoidable.**
GLOBAL CLIMATE CHANGE, GREENHOUSE GAS EMISSIONS, AND SEA LEVEL RISE						
Enhancement Activities/ Materials Disposal/ Reuse[1]	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
NOISE						
Enhancement Activities	Under the Freshwater Alternative, 24-hour operations could occur and nighttime dredging **impacts would be considered significant.**	Under the Saltwater Alternative, 24-hour operations could occur and nighttime dredging **impacts would be considered significant.**	Under the Hybrid Alternative (Options A and B), 24-hour operations could occur and nighttime dredging **impacts would be considered significant.**	No Impact	Freshwater, Saltwater, and Hybrid Alternatives: **Noise-1** All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers. **Noise-2** Exposed engines on dredging equipment shall be housed to the greatest extent possible.	Even with implementation of these measures, nighttime construction outside of allowed hours would result in significant impacts. Noise impacts from nighttime dredging and materials placement remain **significant and unavoidable with implementation of the Freshwater, Saltwater, and Hybrid Alternatives.**
Materials Disposal/Reuse	Nearshore and offshore placement requiring nighttime operation would result in **significant noise impacts.**	Nearshore and offshore placement requiring nighttime operation would result in **significant noise impacts.**	Nearshore and offshore placement requiring nighttime operation would result in **significant noise impacts.**	No Impact		
PUBLIC SERVICES AND UTILITIES						
Enhancement Activities	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
Materials Disposal/Reuse	No Impact	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable
PUBLIC HEALTH AND SAFETY						
Enhancement Activities	Less than Significant	Recreationalists could be tempted to cross the inlet in unsafe conditions as no other easily accessible north/south route is available along the beach. Thus, operation of the Saltwater Alternative with the new inlet could result in a substantial permanent increase in hazards for people swimming, walking, or otherwise recreating in the proposed lagoon	Recreationalists could be tempted to cross the inlet in unsafe conditions as no other easily accessible north/south route is available along the beach. Thus, operation of the Hybrid Alternative with the new inlet could result in a substantial permanent increase in hazards for people swimming, walking, or otherwise recreating in the proposed lagoon	With increases in vector breeding area and improved life cycle conditions, potential for exposure to ~~vectorborne~~vector-borne disease in the nearby communities would increase under the No Project Alternative, and **impacts to public health and safety would be significant.**	Saltwater and Hybrid Alternatives only: **Safety-1** During and following the construction of the new beach inlet, signs will be posted near the inlet to inform beachgoers of the dangers of inlet crossing. ~~No feasible mitigation measures are available to improve permanent recreational safety associated with high water volume/velocities in the newly created open inlet across the beach under the Saltwater and Hybrid Alternatives. Mitigation Measure Land Use 1 would require a pedestrian bridge to be constructed at a feasible location to allow safe and convenient access across the inlet at all times.~~	While Mitigation Measure Land Use-1 would substantially improve public safety associated with the new inlet as it would provide a way for beach users to safely cross the inlet during times of high water levels and velocities, the overall inherent danger of the new inlet during certain conditions would remain for those uninformed persons or those tempted to cross even during unsafe situations. Implementation of Mitigation Measure Safety-1 would further reduce the public safety impact of the inlet, but would not reduce the impact to below a level of significance. Thus, public safety impacts associated with operation of the new tidal inlet under the Saltwater and Hybrid Alternatives

Activity	Significant Environmental Impacts and Significance Determination by Alternative				Mitigation Measures	Level of Significance After Mitigation
	Freshwater Alternative	Saltwater Alternative	Hybrid Alternative	No Project Alternative		
		inlet, and **impacts would be significant.**	inlet, and **impacts would be significant.**			would remain **significant and unavoidable**. Under the No Project Alternative, the potential for exposure to ~~vectorborne~~vector-borne disease in the nearby communities would increase and **impacts to public health and safety would remain significant and unavoidable.**
Materials Disposal/Reuse	Less than Significant	Less than Significant	Less than Significant	No Impact	No mitigation measures are required.	Not Applicable

[1]Enhancement Activities/ Materials Disposal/Reuse considered together for impact calculation and analysis purposes.

Among the enhancement alternatives (Freshwater Alternative, Saltwater Alternative, and Hybrid Alternative), the Freshwater Alternative would result in the least significant environmental impacts as shown in Table ES-10. The Freshwater Alternative would not result in the significant and unavoidable public health and safety impact that would result from the new inlet associated with the other two alternatives. Additionally, as the Carlsbad Boulevard bridge improvements would not occur under the Freshwater Alternative, the significant traffic and circulation impact related to unsafe or unavailable bicycle facilities across the Carlsbad Boulevard bridge during reconstruction would not occur. 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 the Freshwater Alternative would also be to a lesser degree and extent than those resulting from the Saltwater Alternative and Hybrid Alternative. The significant and unavoidable visual impact that would result from the new pedestrian bridge over the new inlet as required by Mitigation Measure Land Use-1 would also not occur under the Freshwater Alternative. Additionally, the Freshwater Alternative would avoid those significant impacts related to flooding, continued degradation of water quality, and vectors that would result from the No Project Alternative. However, the beneficial environmental impacts from the Freshwater Alternative would also be less than for the other alternatives, such as reduced improvements to lagoon hydrologic function and drainage patterns, and fewer enhanced habitat and biological benefits. No Project Alternative would result in none of the beneficial effects to any degree relative to the action alternatives. As an enhancement project, project benefits are an important consideration in comparing alternatives.

The Freshwater Alternative would result in lesser impacts than the Saltwater and Hybrid Alternatives, but would not have the same level of benefits or achieve the CEQA project objectives, as listed in Section ES-4, to the fullest extent or to the same level as the other action alternatives. Most specifically, the Freshwater Alternative would not fully achieve the following objectives to the same extent as the other action alternatives: (1) create conditions that curtail the growth and expansion of cattails, bulrushes, and invasive species; (2) protect, improve, and maintain water quality (e.g., reduce eutrophication) to meet water quality standards and address the 303(d) listed water quality impairments; and (3) reduce vector concerns (e.g., potential for mosquito-borne disease) by minimizing potential mosquito breeding habitat. While the No Project Alternative would result in the fewest number of significant environmental impacts, it would be inconsistent with the overall purpose of the project and this alternative would not achieve any of the project objectives. Therefore, no alternative is clearly environmentally superior to another.

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