Environmental Impact Report / Environmental Impact Statement
for the

San Elijo Lagoon Restoration Project

Final
SCH# 2011111013




Prepared for:
U.S. Army Corps of Engineers
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San Elijo Lagoon RESTORATION Reviving Your Wetlands

MOFFATT & NICHOL
AECOM

Volume 1 of 3
EIR/EIS

February 2016

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READER'S GUIDE

BACKGROUND

A Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) for the San Elijo Lagoon Restoration Project (project) was circulated for public review in August 2014. Several federal, state, and local agencies; private organizations; and individuals submitted comment letters on the Draft EIR/EIS. A total of 39 comment letters and email comments were received by the County of San Diego (County) and the Army Corps of Engineers (Corps), including 23 letters from agencies and organizations and 16 letters from individuals. The County and the Corps prepared responses to all comments received during the public review period, which are included in the Final EIR/EIS as Appendix P, Public Comment Letters and Responses. After public review, the Draft EIR/EIS was revised in several places; either in response to public comments received or the project Applicant's, County's or Corps' desire to clarify a matter. In addition, refinements have been incorporated into Alternative 1B. The resulting Alternative 1B – Refined is described in text and figures in a Preface to the Final EIR/EIS, and potential impacts/benefits of this refined alternative are disclosed. The following provides an explanation of the modifications made to the Draft EIR/EIS.

DOCUMENT MODIFICATIONS

<u>General Document Modifications</u>

Issue 1

A Preface has been added to the document to describe and discuss the impacts of Alternative 1B – Refined, which was identified as the Preferred Alternative (CEQA) and preliminary Least Environmentally Damaging Practicable Alternative (NEPA) after public review of the Draft EIR/EIS. Consequently, all references to Alternative 2A as the proposed project have been removed from the document. Alternative 1B – Refined would be very similar to Alternative 1B as described in the Draft EIR/EIS, with the exception of specific refinements made to reduce impacts associated with the project, as described below. Overall, refinements would result in a grading decrease of approximately 28 acres at selected areas in the central and east basins. The extent of inundation would also be reduced under Alternative 1B – Refined by approximately 85 percent (110 acres), resulting in a substantial decrease in impacts to habitat. Impacts of Alternative 1B – Refined are the same as or less than those described for Alternative 1B, and are disclosed in detail in the Preface. As discussed in the Preface, these changes do not result in identification of new significant environmental impacts, or a substantial increase in the severity of environmental impacts, nor has the applicant declined to adopt feasible mitigation or avoidance measures that would clearly lessen the environmental impacts of the project.

Overview of Modifications in Alternative 1B – Refined

Refinement	Resulting Reduction in Habitat Impacts
Reduced channels – Proposed channels reduced in size, where hydraulic capacity could be maintained to ensure drainage of freshwater flows and would allow tidal exchange. Reductions in channels specifically occurred in the east basin, removing one channel connection and reducing the main channel width.	Reduction of channels in the east basin preserves existing salt panne habitat east of the existing CDFW weir and high salt marsh habitat in the far east basin.
Reduced transitional area – The acreage of proposed transitional areas within the central and east basins reduced. Some transitional area is still proposed to supplement the lagoon's resiliency into the future under sea level rise.	Reduction of transitional areas decreases the conversion of jurisdictional wetland to upland. Specifically, the transitional area in the east basin was redesigned to avoid impacts to existing salt panne habitat east of the CDFW weir. Areas in the southern portion of the central basin were reduced in size to reduce impacts to mudflat and mid-marsh. Transitional habitat proposed in the refugia area in the northwest portion of the central basin was removed.
Reduced shallow grading/dredging – Shallow grading/dredging areas designed to create mudflat and low-marsh have been reduced by 28 acres, while maintaining sediment removal needed to address water quality concerns (eutrophication caused by soil nutrient accumulation).	Grading/dredging in salt marsh in the southern portion of the central basin has been reduced, resulting in a decrease in mudflat proposed, but decreased impacts to existing mid-marsh habitat. In the west basin, an area proposed for creation of low-marsh has been eliminated, reducing impacts to mudflat and surrounding mid-marsh.
Reduced size of overdredge pit – With the refinements above, and steepening of the side slopes from 5:1 to 3:1, the volume of the overdredge pit was reduced by approximately 25 percent and area reduced by 40 percent.	Reducing the size of the overdredge pit decreases potential impacts to existing and emergent low-marsh habitat in the central basin.
Reduced inundated area – Areas proposed for shallow grading/dredging would be graded by equipment that can construct in wet/soft conditions. Equipment would be restricted to the proposed limits of disturbance and would place removed sediment in channel areas that would be later dredged. Because dredging would be limited to channels, required water elevations would decrease and 85% less habitat would be inundated during construction.	Mortality of vegetation could occur in areas inundated for extended periods of time (more than 3 months). Reducing the extent and duration of inundation reduces mortality impacts to vegetation, as well as corresponding impacts to species that depend on that vegetation for nesting and foraging. Water would also be released intermittently, as recommended by the on-site biologist, enabling tidal exchange and circulation in the basin during construction. Intermittent release of water controls would allow tidal exchange in the basin under construction, similar to existing tide cycles. Because occasional tidal inundation would occur through construction, maintenance of lower than normal water levels would not be anticipated to result in additional effects to habitat or other resources. Post-construction recovery would also be enhanced because more habitats would remain intact during construction.

Issue 2

The California Environmental Quality Act (CEQA) significance thresholds in Section 3.16 Global Climate Change and Greenhouse Gas Emissions have been revised based on new guidelines from the County. The Draft EIR/EIS included thresholds recommended during development of the Climate Action Plan (CAP). The CAP is currently being revised by the County and is anticipated to be complete in 2017. As a result of the updates to the CAP, the County of San Diego Planning and Development Services issued the *Recommended Approach to Addressing Climate Change in CEQA Documents* in January 2015. These guidelines provided in this document are more conservative than those used in the Draft EIR (900 MT CO_2e instead of 2,500 MT CO_2e) and have been incorporated into the analysis for the Final EIR/EIS. This update does not constitute significant new information under CEQA Section 15088.5 because it does not encompass a change in the project, the environmental setting or related data, as described in CEQA Section 15088.5. The significance conclusion does not change from that disclosed in the Draft EIR/EIS.

Issue 3

In response to public comments and agency coordination, a generalized conceptual restoration plan has been added to the Final EIR/EIS as Appendix Q, Conceptual Restoration Plan. The addition of the Conceptual Restoration Plan does not constitute significant new information under CEQA Section 15088.5 because it merely clarifies and expands on information in the Draft EIR/EIS, as allowed under CEQA Section 15088.5.

Issue 4

Since release of the Draft EIR/EIS, additional information has become available regarding biological conditions in the lagoon. Review and analysis of the information consistent with CEQA Section 15088.5(a) is provided in Appendix R, Consideration of New Information under CEQA Section 15088.5(a). The CEQA-specific appendix documents reasons why this new available information does not necessitate recirculation of the Draft EIR.

Specific Document Modifications

Chapter 1.0 – Introduction

- Table 1-5 – Location of Required EIR Components, has been added.

Chapter 2.0 – Project Description

- Throughout Chapter 2: Discussion of existing water quality issues has been added.
- Throughout Chapter 2: Discussion of regional trends in wetland habitat changes has been added.
- Throughout Chapter 2: Discussion of changes to frequency of lagoon mouth opening since human intervention has been added.
- Throughout Chapter 2: Discussion of construction method impacts on soil characteristics has been added.
- Page 2-2: Discussion of historical habitat distribution and hydrology within the lagoon has been added.
- Section 2-11: Clarification regarding comprehensive construction monitoring program has been added.
- Table 2-17: Difference between existing and proposed habitat acreages has been added.
- Table 2-2: Discussion regarding LA-5’s status as a currently approved ocean disposal site has been added.
- Table 2-20: Material placement capacities for offshore sites have been added as a footnote.
- Changes to Table 2-26:
    - Detail regarding inspection of construction equipment for invasive species has been added.
    - Detail added regarding potential for snowy plover nesting on beaches, as well as related monitoring requirements during materials placement, has been added.
    - Detail regarding preparation of a habitat enhancement plan has been added to PDF-21.
    - PDFs have been reorganized for clarity, and new numbering can be found in leftmost column.
    - Information regarding grunion monitoring has been added to PDF-57.

Chapter 3.0 – Affected Environment and Environmental Consequences

A number of other minor changes and clarifications have been made to Chapter 3, Affected Environment and Environmental Consequences. These changes reflect minor additions or clarifications and do not involve “significant new information” (with related explanations and/or references to additional discussion in other portions of the Final EIR/EIS provided where appropriate). These changes are in response to comments received during public review of the Draft EIR/EIS, as well as several of the previously noted design modifications. Clarification has also been added to some sections to identify how CEQA significance criteria were derived.

The following discussion addresses changes in the Final EIR/EIS to the following sections: 3.1 Land Use/Recreation; 3.2, Hydrology; 3.5, Geology/Soils; 3.6, Biological Resources; 3.10, Traffic, Access, and Circulation; 3.11, Air Quality; 3.16, Climate Change and Greenhouse Gas Emissions.

Section 3.1 – Land Use/Recreation

- Table 3.1-2: Conclusions have been added for each alternative.
- Page 3.1-38: Clarification regarding surfing impacts and benefits has been added.

Section 3.2 – Hydrology

- Throughout Section 3.2: Discussion has been added regarding historic changes in the condition of the lagoon mouth.
- Throughout Section 3.2: Discussion has been added about existing water quality issues within the lagoon, and the necessity of removing high-nutrient sediment to address those issues.
- Page 3.2-14: Additional description of drainage patterns and circulation from Alternative 2A has been incorporated.
- Page 3.2-15: Description of shortened flood duration under Alternative 2A has been added.
- Page 3.2-16: Discussion of increase in impervious area from Alternative 2A has been added.
- Page 3.2-28: Description of construction- and post-construction permit requirements has been added.

Section 3.5 – Geology/Soils

- Page 3.5-13: Clarification that Encinitas and Caltrans would be reviewing agencies for bridge design has been added.

Section 3.6 – Biological Resources

- Throughout Section 3.6: Information from monthly bird counts and discussion of nonlisted bird species have been included.
- Page 3.6-9: Percentages have been added for Primary Constituent Elements (PCEs) for California gnatcatcher.
- Page 3.6-34: Discussion of nonlisted migratory/wintering shorebirds has been added.

- Table 3.6-6: The difference in acreages between existing conditions and each project alternative has been added.

Section 3.10 – Traffic, Access, and Circulation

- Page 3.10-2: Mitigation measure Traffic-1 has been expanded to include submittal of traffic control plans to the City of Encinitas for approval.

Section 3.11 – Air Quality

- Clarifying language has been added to differentiate between CEQA and NEPA conclusions.

Section 3.16 – Climate Change and Greenhouse Gas Emissions

- Threshold for significance of greenhouse gas emissions under CEQA reduced from 2,500 to 900 MT CO_2e.
- Table 3.16-8 has been added to show projected 2065 habitat distribution with sea level rise for each alternative.

Chapter 5.0 – Cumulative Impacts

- Changes to Table 5-1:
  - Various projects have been added and/or updated in the cumulative impacts analysis, including the Storm Damage Reduction Project, Moonlight State Beach Lifeguard Tower, Olivenhain Trunk Sewer Project, San Dieguito W-19 Restoration Project, and ongoing Batiquitos Lagoon dredging.
  - Additional detail has been included regarding I-5 North Coast Corridor improvements within the lagoon.
  - Additional detail has been inserted regarding cultural impacts of LOSSAN rail corridor improvements within the lagoon.
- Additional discussion has been included throughout chapter regarding mitigation measures considered for significant cumulative impacts.

CONSIDERATIONS UNDER STATE CEQA GUIDELINES SECTION 15088.5(a)

Under CEQA (Section 15088.5), recirculation of an EIR is required when significant new information is added to an EIR after the availability of a draft EIR for public review, but prior to certification. Information can include changes in the project or environmental setting as well as additional data or other information. However, new information added to an EIR is not considered significant unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect. Per CEQA Guidelines "significant new information" that would necessitate recirculation can include a new significant environmental impact; a substantial increase in the severity of an environmental impact; a feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it; or the draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. CEQA Guidelines (Section 15088.5 (b)) further clarifies that recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.

As shown in the list of changes made to the Final EIR, information added to the EIR was for the purpose of clarity, emphasis, and/or depth of discussion in response to public comment. Minor typographical errors or inaccurate wording were corrected, but these revisions were not of the nature or magnitude to result in changes to the analysis or conclusions of the EIR. Thus, based on CEQA Guidelines (Section 15088.5 (b)), these changes do not necessitate recirculation.

Per CEQA, "significant new information" that would necessitate recirculation also includes a feasible project alternative or mitigation measure considerably different from others previously analyzed that would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it. The Preface to the Final EIR provides a description of a refined Alternative 1B as the Preferred Alternative. Alternative 1B – Refined represents a refined Alternative 1B as presented in the Draft EIR and reflects further engineering design and modifications made in response to public comment. While Alternative 1B – Refined represents a feasible project alternative that would lessen environmental impacts, it is not considerably different from Alternative 1B as included in the Final EIR, rather it provides refinements based on less impactive construction methods and other enhancements made in response to public comments. A detailed comparison of Alternative 1B – Refined to Alternative 1B is provided in the Preface of this Final EIR/EIS. There are no new significant impacts associated with Alternative 1B – Refined. For these reasons, the inclusion of Alternative 1B – Refined as the Preferred Alternative in the Final EIR does not necessitate recirculation of the environmental document.

Based on the discussion above, the County of San Diego Board of Supervisors has determined that the changes made to the Draft EIR following public review do not constitute "significant new information" per CEQA Section 15088.5(a) and, therefore, recirculation of the Draft EIR/EIS is not required.

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PREFACE

The Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the San Elijo Lagoon Restoration Project (SELRP) did not identify a Preferred Alternative. The San Elijo Lagoon Conservancy (SELC), County of San Diego (County), and U.S. Army Corps of Engineers (Corps) chose to consider project impacts and public/agency input in the ultimate selection of a Preferred Alternative. Subsequent to release of the Draft EIR/EIS, and based upon input from the public plus local and regulatory agencies, Alternative 1B – Refined was developed and is identified as the Preferred Alternative by the SELC in this Final EIR/EIS. Alternative 1B – Refined has also been identified as the Preliminary Least Environmentally Damaging Practicable Alternative (LEDPA) by the Corps in the Draft 404(b)(1) Alternatives Analysis (Appendix O). Alternative 1B – Refined represents Alternative 1B with engineering and construction method refinements reflecting public comments and agency input (Figure P-1). These refinements would reduce the construction footprint and modify the construction method. Accordingly, impacts to existing and emergent habitats within the lagoon would be reduced, while still achieving project objectives (e.g., water quality improvements). This Preface provides the reader with project information about Alternative 1B – Refined and a disclosure of potential environmental impacts and benefits associated with the refined alternative compared to baseline conditions. Impacts are also compared to those described for Alternative 1B in Chapter 3 to confirm implementation of Alternative 1B – Refined would not result in any new significant or substantially adverse impacts.

DESCRIPTION OF REFINED ALTERNATIVE

OVERVIEW

As shown in Figure P-2 and Table P-1, Alternative 1B – Refined would be very similar to Alternative 1B with the following differences:

- Reduced channel widths and elimination of a proposed channel in the east basin.
- Reduction in created upland transitional areas in the central and east basins.
- Elimination of selected areas of shallow grading/dredging in the central and west basins, thereby retaining existing habitat at those locations.
- Reduction in the size of the overdredge pit via a smaller footprint and steepening the slopes, with less associated materials for beneficial reuse.

- Modified construction methods that would require less inundation (in both extent and duration).

This alternative would retain the following elements:

- A more stable and connected gradient of balanced habitat types would be created relative to existing conditions.
- Existing tidal inlet would remain and no cobble blocking features (CBFs) would be required at the inlet opening.
- Main tidal channel would be extended to the east basin and a mix of mudflats and secondary channels would be created south of the main channel in the central basin.
- Channel in the east basin would be enlarged and the California Department of Fish and Wildlife (CDFW) dike and weir would be removed.
- Existing Coast Highway 101 bridge structure would be armored against ongoing scour. In addition, the bridge would be seismically retrofitted by others.
- Bridge improvements at Interstate-5 (I-5) planned by the California Department of Transportation (Caltrans) would be implemented.
- Existing bridges at Coast Highway 101 and the North County Transit District (NCTD) would remain, but channels underneath would be deepened.
- Inlet and channel dimensions, and rock armoring, at all three crossings would be identical to Alternative 1B.
- Former sewage settling pond in the central basin would be capped with sand and topped with crushed shell for use as an avian nesting area.
- Reuse of beneficial materials in the nearshore and on-shore.
- Inlet maintenance, post-project, would occur annually.

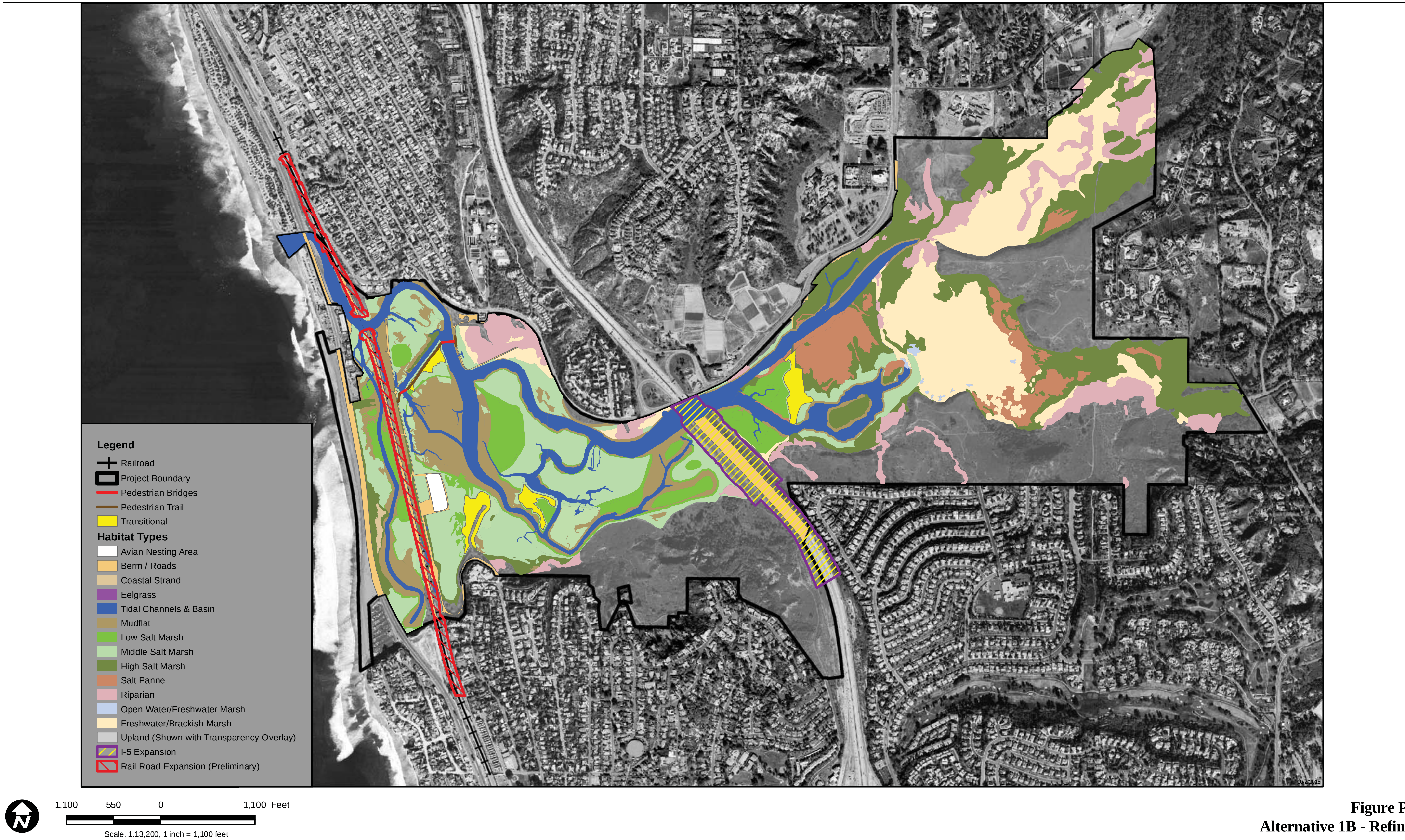

Figure P-1
Alternative 1B - Refined

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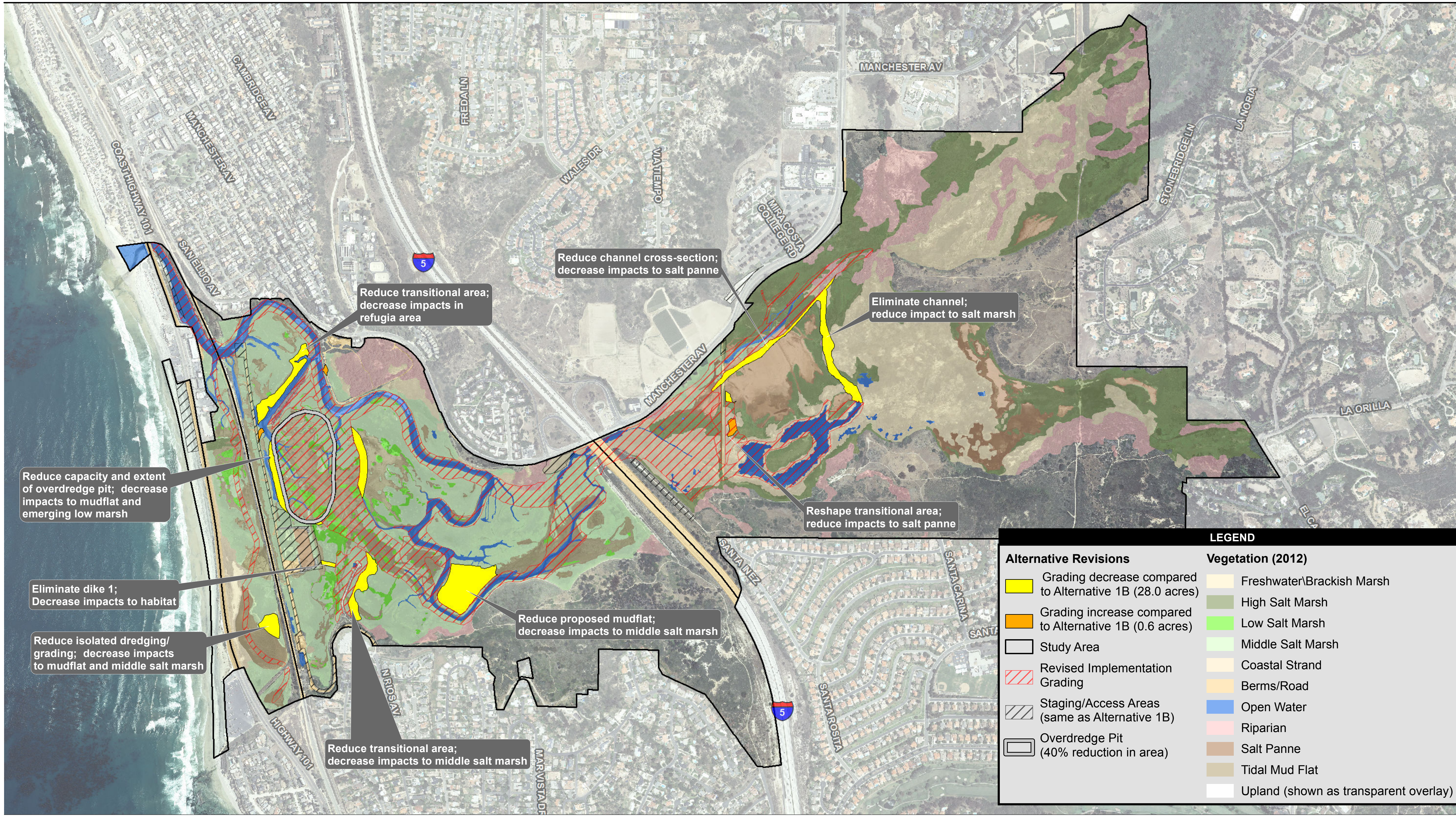

Source: SANDAG 2012; MoffattNichol; AECOM 2013

1,100 550 0 1,100 Feet

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

Figure P-2
Areas of Grading Refinement
Alternative 1B - Refined Relative to Alternative 1B

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Table P-1
Overview of Refinements Incorporated into Alternative 1B – Refined

Refinement	Resulting Reduction in Habitat Impacts
Reduced channels – Proposed channels reduced in size, where hydraulic capacity could be maintained to ensure drainage of freshwater flows and allow tidal exchange. Reductions in channels specifically occurred in the east basin, removing one channel connection and reducing the main channel width from 275 to 180 feet.	Reduction of channels in the east basin preserves existing salt panne habitat east of the existing CDFW weir and high salt marsh habitat in the far east basin.
Reduced transitional area – The acreage of proposed transitional areas within the central and east basins reduced from 12 acres to 10. Some transitional area is still proposed to supplement the lagoon's resiliency into the future under sea level rise.	Reduction of transitional areas decreases the conversion of jurisdictional wetland to upland. Specifically, the transitional area in the east basin was redesigned to avoid impacts to existing salt panne habitat east of the CDFW weir. Areas in the southern portion of the central basin were reduced in size to reduce impacts to mudflat and mid-marsh. Transitional habitat proposed in the refugia area in the northwest portion of the central basin was removed.
Reduced shallow grading/dredging – Shallow grading/dredging areas designed to create mudflat and low-marsh have been reduced by 28 acres, while maintaining sediment removal needed to address water quality concerns (eutrophication caused by soil nutrient accumulation).	Grading/dredging in salt marsh in the southern portion of the central basin have been reduced, resulting in a decrease in mudflat habitat, but decreased impacts to existing mid-marsh habitat. In the west basin, an area proposed for creation of low-marsh has been eliminated, reducing impacts to mudflat and surrounding mid-marsh.
Reduced size of overdredge pit – With the refinements above, and steepening of the side slopes from 5:1 to 3:1, the volume of the overdredge pit was reduced by approximately 25 percent and area reduced by 40 percent.	Reducing the size of the overdredge pit decreases potential impacts to existing and emergent low-marsh habitat in the central basin.
Reduced inundated area – Areas proposed for shallow grading/dredging would be graded by low-pressure equipment that can construct in wet/soft conditions. Equipment would be restricted to the proposed limits of disturbance, and would place removed sediment in channel areas that would be later dredged. Because dredging would be limited to channels, required water elevations would decrease and 85 percent less habitat would be inundated during construction.	Reducing the extent and duration of inundation reduces mortality impacts to vegetation, as well as impacts to species that depend on that vegetation for nesting and foraging. Impounded water would be released intermittently, as recommended by the on-site biologist, enabling tidal exchange and circulation in the basin during construction. Intermittent release of water controls would allow tidal exchange in the basin under construction, similar to existing tide cycles. Because occasional tidal inundation would occur through construction, maintenance of lower than normal water levels would not be anticipated to result in additional effects to habitat or other resources. Post-construction recovery would also be enhanced because more habitats would remain intact during construction.

Overall, refinements would result in a grading/dredging decrease of approximately 28 acres at selected areas in the central and east basins (shown in yellow in Figure P-2), and a slight increase in grading/dredging (0.5 acre) at an isolated location in the east basin (shown in orange in Figure P-2). The isolated increase is necessary to reshape the transitional area and reduce impacts to salt panne. There would be no additional species impacted by the increased grading/dredging at this location. The reduction in grading/dredging locations would occur in, or adjacent to, channels and transitional areas to preserve existing habitats (including low-marsh, mid-marsh, and salt panne), as well as a reduction in the size of the overdredge pit. With the incorporation of these refinements, the extent of area affected by inundation would be decreased by approximately 110 acres, or 85 percent. Refinements reflect a tradeoff in minimizing impacts to existing and emergent habitat, while maintaining a project design that would still achieve the physical and water quality objectives of the project.

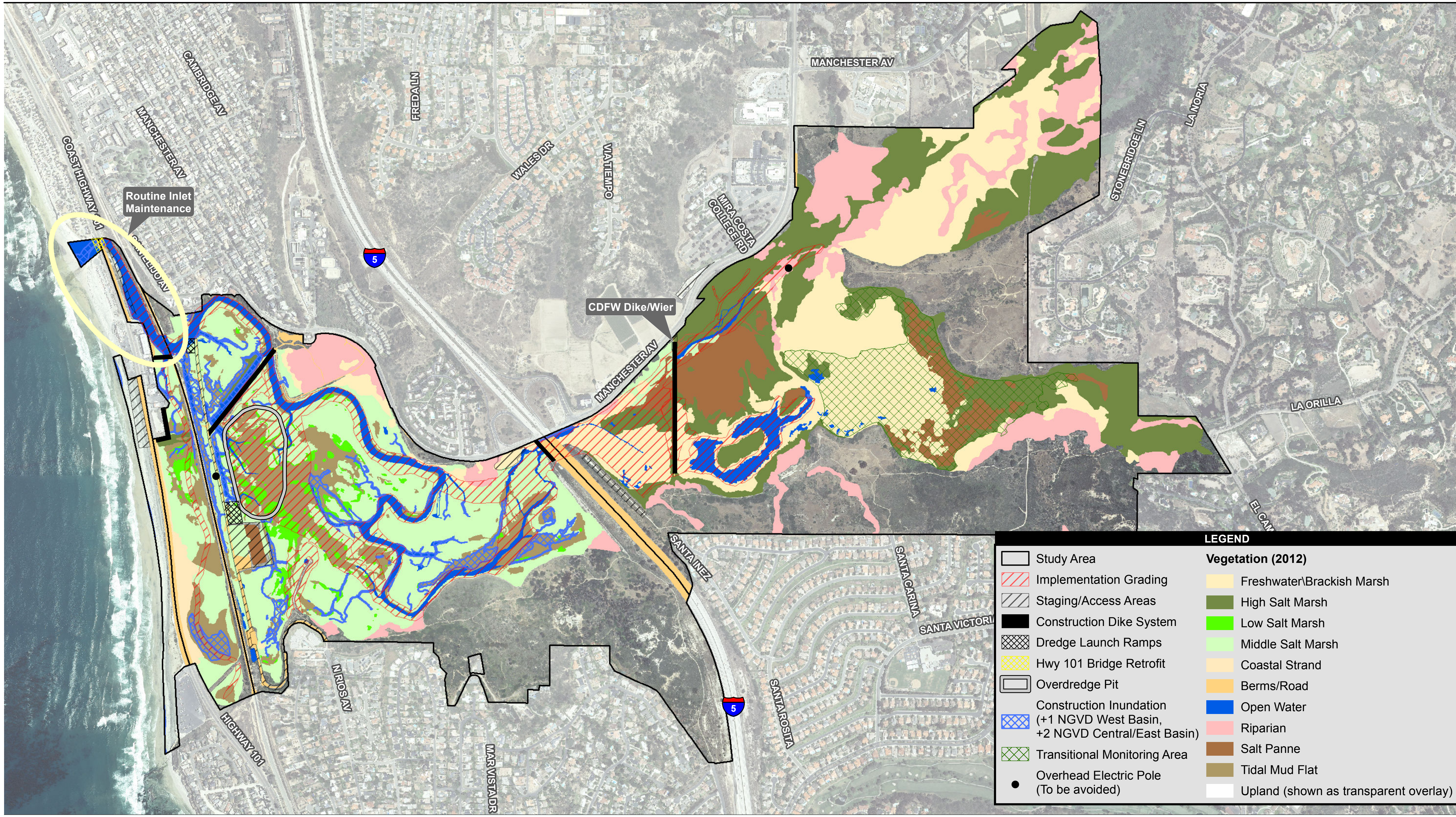
SPECIFICS

More detail about construction methods, habitat distribution, and materials removal/periodic maintenance is provided below.

Construction Methods

The modified construction approach under Alternative 1B – Refined would reduce inundation by utilizing low-pressure earth-moving equipment in areas proposed for shallow grading/dredging. For example, areas proposed to be lowered in elevation outside of channels (thus creating mudflats or low-marsh) would be graded by equipment designed to work within wetland soils (identified as areas of shallow grading/dredging in this discussion). This low-pressure earth-moving equipment would grade areas outside of channels and would have tracks specifically used to allow the equipment to remain on the surface of marsh sediments and minimize soil compaction during grading. Sediment removed during grading would be temporarily shifted to adjacent channels proposed for dredging. This activity would occur under relatively dry conditions rather than requiring inundation to float a dredge to modify the elevation in those areas.

Under the refined approach, the proposed dike system would be utilized to control water levels to maintain both dry and wet conditions (relative to existing), but at lower water elevations than previously proposed under Alternative 1B. After completion of grading, water levels would be increased to up to +1 foot National Geodetic Vertical Datum (NGVD) in the west basin, and up to +2 feet NGVD in the central and east basins, inundating areas primarily within channels. A cutterhead dredge would then remove both the sediment that was shifted using the low-pressure equipment and the excess channel sediment, and place both in the overdredge pit as described in Section 2.10.1 for Alternative 1B. Water controls would also be released intermittently, as recommended by the on-site biologist, enabling tidal exchange and circulation in the basin under construction. Impact areas associated with grading/dredging and inundation are shown in Figure P-3.



Source: SANDAG 2012; MoffattNichol; AECOM 2013

1,100 550 0 1,100 Feet

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

Note: Alternative 1B - Refined would reduce inundation impacts by 85% compared to Alternative 1B. Approximately 20 acres would be inundated at different times during construction compared to 130 acres under Alternative 1B.

Figure P-3
Alternative 1B - Refined
Limits of Disturbance

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Table P-2 outlines phasing and durations, constraints, and requirements for Alternative 1B – Refined compared to those described for Alternative 1B in the Draft EIR/EIS. The proposed dike system would be constructed to control water levels, but, rather than constructing primarily under inundated conditions, a mixture of dry and wet conditions (compared to existing conditions) would be used, with a smaller elevation range (-3 feet to +2 feet NGVD compared to a maximum inundation of +6 feet NGVD proposed under Alternative 1B). Grading would occur in areas proposed for shallow grading/dredging (e.g., mudflats and low-marsh adjacent to channels), while dredging would be limited to the creation of the overdredge pit and channels. Phasing to maintain lower than normal water levels (-3 feet NGVD) would enable shallow grading to be completed initially.

Resulting Habitat Distribution

The proposed habitat distribution for Alternative 1B – Refined would be influenced by the reductions in grading/dredging. Changes to the proposed habitat distribution are shown in Figure P-1, and resulting acreages for specific habitats are shown in Table P-3. The refined habitat distribution would provide a connected gradient of balanced habitat types in the lagoon, similar to Alternative 1B, although some ultimate acreages anticipated under Alternative 1B – Refined would be different (e.g., low-marsh would be reduced by 1 acre) due to less area being graded to provide for conversion of habitat from its existing configuration. Maintenance and adaptive management, as described in Section 2.11, would also be a part of the refined alternative.

MATERIALS REMOVAL AND PERIODIC MAINTENANCE

Alternative 1B – Refined would involve creation of an overdredge pit to allow for disposal of poor-quality material and to provide material suitable for reuse within the littoral zone. Approximately 920,000 cubic yards (cy) of material would be exported from the overdredge pit in the central basin for reuse. This is a decrease from the 1.2 million cy (mcy) originally identified for export under Alternative 1B, as shown in Table P-4. Activities associated with long-term maintenance and adaptive management are discussed in Section 2.11 of this EIR/EIS.

Table P-2
Construction Phasing for Alternative 1B – Refined

Phase 1		Phase 2		Phase 3		Phase 4	
Construction Activity	**Reduction in Impacts**	**Construction Activity**	**Reduction in Impacts**	**Construction Activity**	**Reduction in Impacts**	**Construction Activity**	**Reduction in Impacts**
Construct dike 2 in central basin and confirm/improve CDFW dike Launch dredge to create overdredge pit/discharge sand to materials placement sites (10 months). Clear/grub 25,000 cy vegetation from central basin grading area (3 months)/ export to disposal location. Close dike 2 and maintain water elevation at -3 feet NGVD to allow grading outside of channels (3 months). Reopen dike 2 after grading, leaving lagoon open to tidal action while overdredge pit is completed. Complete North Rios access road and staging/access area preparation.	Dike 1 no longer needed to maintain refugia. Construction of the overdredge pit can occur concurrently with clear and grub and grading outside channels. Inundation of habitat minimized.	Close dike 2 and maintain water elevation at +2 feet NGVD in central basin and west portion of east basin. Dredge material from channels over 4 months and place in overdredge pit (550,000 cy). Construct central basin transitional areas. Clear and grub east basin between I-5 and CDFW dike (240,000 cy). Construct dike 4 under I-5 to enable control of water elevation in east basin during Phase 3. Release dike 2 and open central basin to tidal action and recovery.	Dredging would be limited to channels, and water elevations would only be required to +2 ft. NGVD. Because of limited inundation, impacts to existing vegetation would be substantially reduced, and a much smaller area of planting would be needed.	Maintain water elevation in east basin at -3 NGVD using dike 4 and lower CDFW dike 3. Clear/grub east basin east of CDFW dike (30,000 cy). Grade east basin outside of channels (3 months). Elevate water level to +2 feet NGVD to dredge channel areas (700,000 cy) and place in overdredge pit (4 months). Construct east basin transitional areas. Lower dike 4 under I-5 and open east basin to tidal action and recovery.	Inundation of habitat minimized. Dredging would be limited to channels, and water elevations would be required to +2 ft. NGVD.	Build dike 5 and protective dike in west basin Close dike 5 to maintain water level at -3 feet NGVD. Clear/grub west basin (10,000 cy). Inundate to +1 ft. NGVD, dredge channel and place in overdredge pit, nest site, and/or littoral cell placement sites. Lower dikes, leaving basin and rest of lagoon open to tidal action. Clear tidal inlet and channel to design dimensions.	Inundation of habitat minimized.

Note: Location of dikes shown in Figure 2-15. In Alternative 1B-Refined, Dike 1 is not needed, but numbering system remains as under Alternative 1B for comparison purposes.

Table P-3
Alternative 1B – Refined Habitat Distribution

Habitat Type	Habitat Distribution (acres) Existing[1]	Alternative 1B	Alternative 1B – Refined	Habitat Type	Habitat Distribution (acres) Existing[1]	Alternative 1B	Alternative 1B – Refined
Avian Nesting Areas	0	2	2	Open Water/Tidal Channels and Basins	40	67	63
Mudflat	63[2]	71	66	Riparian	72	67	67
Low-Marsh	13	51	50	Coastal Strand	5	5	5
Mid-Marsh	141	98	105	Upland & Others	299	295	295
High-Marsh	120	124	125	Beach	15	15	15
Salt Panne	37	30	32	Berms and Roads	23	24	24
Freshwater/Brackish Marsh	132	99	101	Transitional (man-made)	0	12	10

[1] Existing habitat acreages are from 2012 mapping efforts and reflect habitat distributions at that time.
[2] Current functioning mudflat is an artifact of past freshwater impoundment and is converting to low- and mid-marsh because it is not at an elevation for sustainable mudflat.
Source: Nordby and M&N 2012; M&N 2015

Table P-4
Alternative 1B Materials Removal and Periodic Maintenance

	Alternative 1B	Alternative 1B – Refined
Initial Amount of Material Removed	1.2 million cubic yards	920,000 cubic yards
Coastal Area	0 cubic yards	0 cubic yards
West Basin	50,000 cubic yards	50,000 cubic yards
Central Basin	400,000 cubic yards	450,000 cubic yards
East Basin	750,000 cubic yards	380,000 cubic yards
Estimated Post-construction Periodic Volume Removed	40,000 cubic yards	40,000 cubic yards
Estimated Post-construction Periodic Maintenance Frequency	Annually	Annually

Source: Nordby and M&N 2012, 2015

As shown in Table P-4, the greatest change in material removal associated with Alternative 1B-Refined would be in the east basin where one channel segment would be removed entirely and another reduced.

ENVIRONMENTAL CONSEQUENCES

Implementation of Alternative 1B – Refined would not result in any new significant environmental impacts, nor in impacts with severity substantially increased beyond that disclosed for Alternative 1B in the Draft EIR/EIS. For disclosure of anticipated impacts associated with the Preferred Alternative 1B – Refined, a brief discussion by issue area is provided below. Table P-8 is located at the end of this Preface and provides a summary of impacts under both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), mitigation measures, and an impact conclusion for each issue area discussed below. This discussion is derived from the information in Chapters 3 and 4 of this EIR/EIS and focuses on impacts and benefits that would result compared to baseline conditions and where impacts or benefits would differ between Alternative 1B and the Preferred Alternative 1B – Refined. It follows the same issue area order as Chapter 3. This Final EIR/EIS is a joint document prepared consistent with state and federal law and some conclusions vary between CEQA and NEPA. Where conclusions under CEQA and NEPA differ, text is included to clarify when an impact is significant (under CEQA) or substantially adverse (under NEPA). The analysis also reflects project design features (PDFs) as described in Section 2.10 that are referenced in Chapter 3 as well as significance criteria that are defined explicitly in Chapter 3. Resource-specific acronyms are listed in the Index at the beginning of the document but are not redefined in this Preface. The reader is referred to the corollary section of Chapter 3.

The discussion of Alternative 1B – Refined in this resource analysis is focused on the lagoon restoration component of the SELRP; materials placement options would remain the same as discussed in Chapter 3 of the EIR/EIS and are not repeated here. There would be significant and/or substantial adverse impacts to noise associated with materials placement under Alternative 1B. These impacts would remain significant and substantially adverse. Overall, less quantity would be placed as part of the Alternative 1B – Refined approach, which could reduce noise impacts. Given that no single placement site would receive more material than identified in the Draft EIR/EIS, impacts associated with materials placement under Alternative 1B – Refined would not be more severe than those identified throughout Chapter 3.

LAND USE/RECREATION

No permanent conversion of lands to other uses would occur with implementation of Alternative 1B – Refined, and the project would not strain or conflict with surrounding land uses. Permanent and temporary impacts related to land use and recreation would remain the same as disclosed for Alternative 1B in Section 3.1.

HYDROLOGY

Temporary impacts to lagoon hydrology from implementation of Alternative 1B – Refined would be similar to those discussed for Alternatives 1B in Section 3.2. The construction approach would include controlled water levels in diked areas during grading/dredging activities, minimizing the release of turbidity to the ocean. Grading/dredging extent would be approximately 155 acres and 920,000 cy of material would be moved into the overdredge pit. Additionally, approximately 20 acres would be inundated. Long term inundation would result in vegetation mortality and potential for exposed soils and associated erosion. However, this would be approximately 27 acres less grading than Alternative 1B, 280,000 cy less material moved into the overdredge pit, and 85 percent less inundation area. Alternative 1B – Refined would have similar permanent or temporary impacts to hydrology, but would be slightly less as compared to Alternative 1B, as described in Section 3.2.

Oceanography/Coastal Processes

Alternative 1B – Refined would not result in substantial changes to beach erosion, the littoral system, risk of damage to coastal structures or maintenance frequency. Permanent and temporary impacts related to oceanography and coastal processes would remain the same as disclosed for Alternative 1B in Section 3.3

Water and Aquatic Sediment Quality

Refinements associated with Alternative 1B – Refined would result in less inundation, grading/dredging, and ground disturbance than described in Section 3.4, resulting in fewer temporary impacts to water quality due to the potential release of pollutants or sedimentation. Areas adjacent to channels identified for grading with low-pressure earth-moving equipment as part of the refinements made to Alternative 1B would minimize the potential for turbidity within the wetland. The extent of impounded areas would be reduced, with approximately 20 acres inundated, and could be maintained for a shorter duration than that identified in Section 3.4. Dredge equipment movement would provide mechanical circulation, promoting localized lagoon circulation and turnover during inundation. In addition, water would be released intermittently during periods of no construction, enabling periods of tidal exchange and circulation. Permanent and temporary impacts related to water and aquatic sediment quality, would remain the same, or less than, those disclosed for Alternative 1B in Section 3.4. Mitigation would reduce CEQA impacts to below a level of significance.

Geology/Soils

Restoration activities and ongoing maintenance for Alternative 1B – Refined would require excavation of less material than discussed for Alternative 1B in Section 3.5. In total, approximately 920,000 cy would be removed from the lagoon basins and tidal channels. The extent of grading/dredging and other ground disturbance for Alternative 1B – Refined can be seen in Figure P-3.

The overdredge pit would be located 145 feet from the NCTD railroad embankment, as discussed for Alternative 1B. As discussed for in Section 3.5, however, even if the pit unexpectedly collapsed, the railroad embankment stability would be unaffected. The slopes would be steepened slightly (5:1 ratio) compared to the 3:1 ratio discussed in Section 3.5. If the overdredge pit slope were to become unstable during a strong earthquake, sufficient distance would exist between the overdredge pit and the railroad berm to preclude impacts to the berm from the overdredge pit (AECOM 2015). Permanent and temporary impacts related to geology and soils would remain the same as disclosed for Alternative 1B in Section 3.5.

BIOLOGICAL RESOURCES

Refinements associated with Alternative 1B – Refined would result in fewer biological resource impacts compared to those described for Alternative 1B in Section 3.6. A total of approximately 155 acres would be graded/dredged under Alternative 1B-Refined, compared to 181.9 acres under Alternative 1B In areas where grading has been reduced, existing habitat would remain in place, thereby reducing temporary impacts to vegetation and species. In addition, reduced grading would provide for more invertebrate retention in the topsoil, reducing temporary impacts to foraging bird species. The extent of inundation under Alternative 1B – Refined would also be substantially reduced, with proportionally more of the work being completed "in the dry" by low-pressure earth-moving equipment instead of dredging in "wet" conditions. Approximately 20 acres of the lagoon would be inundated in phases with Alternative 1B-Refined, a reduction of 85 percent from the 130 acres of inundation identified under Alternative 1B in Section 3.6. As a result of these refinements, temporary direct impacts to habitat for Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) and light-footed Ridgway's rail (*Rallus obsoletus levipes*) would be less than that discussed under Criterion C for Alternative 1B in Section 3.6. In addition to decreased impacts from reduced grading/dredging, the system would be expected to recover more quickly, since less habitat would be inundated and more habitat would remain intact with the incorporation of the refinements to Alternative 1B. Specifically, temporary impacts to Belding's savannah sparrow nesting habitat were identified as significant and unavoidable (CEQA) and substantially adverse (NEPA) under Alternative 1B. With Alternative 1B – Refined, this impacted acreage would be reduced from 135.7 (52 percent) to 52.1 (20 percent), increasing available nesting habitat during construction (greater than 50 percent remaining available) and reducing the overall direct temporary impact to Belding's savannah sparrow to less than significant (CEQA) and not substantially adverse (NEPA).

Similarly, temporary direct impacts to mid-marsh, low-marsh, and salt panne habitats were identified as significant under Criterion A for Alternative 1B. With Alternative 1B – Refined, this impact to mid-marsh would be reduced from 119.8 acres (85 percent) to 41.6 acres (29 percent), impacts to low-marsh would be reduced from 12.2 acres (92 percent) to 6.5 acres (49 percent), and impacts to salt panne would be reduced from 20.3 acres (55 percent) to 5 acres (14 percent), as shown in Figures P-2 and P-3. With this increase in available habitat (greater than 50 percent remaining available) during construction, temporary direct impacts to these habitats would be considered less than significant under Criterion A. Thus, for Alternative 1B – Refined, direct temporary impacts to suitable nesting habitat for Belding's savannah sparrow, as well as low-marsh, mid-marsh, and salt panne vegetation communities would be considered less than significant under CEQA and not substantially adverse under NEPA. Significant temporary impacts to open water and tidal mudflats would remain higher than 50 percent and would still be considered significant under CEQA and substantially adverse under NEPA for Criterion A.

Post-restoration habitat distribution for the refined alternative is provided in Table P-3. Temporary impacts to threatened and endangered species from Alternative 1B – Refined (shown in Figure P-4, Figure P-5, and Table P-5), as well as the permanent change in nesting and foraging habitats for threatened and endangered species (Table P-6) are shown as well. Other than described above, permanent and temporary impacts related to biological resources would remain the same as disclosed for Alternative 1B in Section 3.6. No feasible mitigation is available to reduce impacts to below a level of significance, as described in Section 3.6.

CULTURAL RESOURCES

There are known cultural resources in proximity to access roads proposed for use during construction of the SELRP. Project design features are included to minimize potential for accidental disturbance, but potential impacts are considered significant. Alternative 1B – Refined would result in impacts to cultural resources as disclosed for Alternative 1B in Section 3.7. Mitigation would reduce CEQA impacts to below a level of significance.

PALEONTOLOGICAL RESOURCES

Project-related ground-disturbing activities would occur only in subsurface layers in areas generally underlain by alluvial deposits that are assigned a low paleontological resource sensitivity. As described in Section 3.8, the proposed access road extending from North Rios Avenue is potentially underlain by the Delmar Formation; surface grading in the area could disturb the underlying sensitive formation. Permanent and temporary impacts related to paleontological resources would remain the same as disclosed for Alternative 1B in Section 3.8. Mitigation would reduce CEQA impacts to below a level of significance.

VISUAL RESOURCES

Construction of Alternative 1B – Refined would be similar to that described for Alternative 1B in Section 3.9 in that construction equipment would be visible in various parts of the lagoon for earthmoving/dredging; however, slightly less area would be graded/dredged (approximately 155 acres). Although there would be slightly less contrast with the refinements made to Alternative 1B, impacts under Criteria A and B would continue to be significant under CEQA and substantially adverse under NEPA because of the multi-year duration of construction and the extent of lagoon modification. Permanent and temporary impacts related to visual resources would remain the same as disclosed for Alternative 1B in Section 3.9. Available mitigation measures would be implemented, but impacts would remain significant and unavoidable.

TRAFFIC, ACCESS, AND CIRCULATION

Construction traffic operations discussed for Alternative 1B in Section 3.10 would remain the same with the refinements associated with Alternative 1B – Refined. Specific trip generation numbers for each alternative may vary but would not be in excess of those analyzed in Section 3.10. Therefore, the discussions of street segment operations and intersection operations in Section 3.10 would also be applicable to Alternative 1B – Refined. Permanent and temporary impacts related to traffic, access, and circulation associated with Alternative 1B – Refined would remain the same as those disclosed for Alternative 1B in Section 3.10. Available mitigation measures would be implemented, but impacts would remain significant and unavoidable.

AIR QUALITY

As described in Section 3.11, construction of Alternative 1B – Refined would primarily involve dredging and off-road equipment operations, although slightly less material would be graded/dredged than originally discussed for Alternative 1B (a total of 920,000 cy). Proportionally more of this work would be completed with low-pressure earth-moving equipment (e.g., swamp dozers) rather than a dredge. The swamp dozers would likely range from 200 to 400 horsepower (hp) compared to the assumptions made for dredges (i.e., greater than 2000 hp) in Section 3.11. Assuming similar hours of operation and equipment model years, this revised equipment approach would not result in substantially increased emissions. Emissions may decrease slightly due to the decrease in intensity of equipment and overall sediment volume removal required. Permanent and temporary impacts to air quality associated with Alternative 1B – Refined would remain similar to those disclosed for Alternative 1B in Section 3.11. Available mitigation measures would be implemented, but CEQA impacts would remain significant and unavoidable.

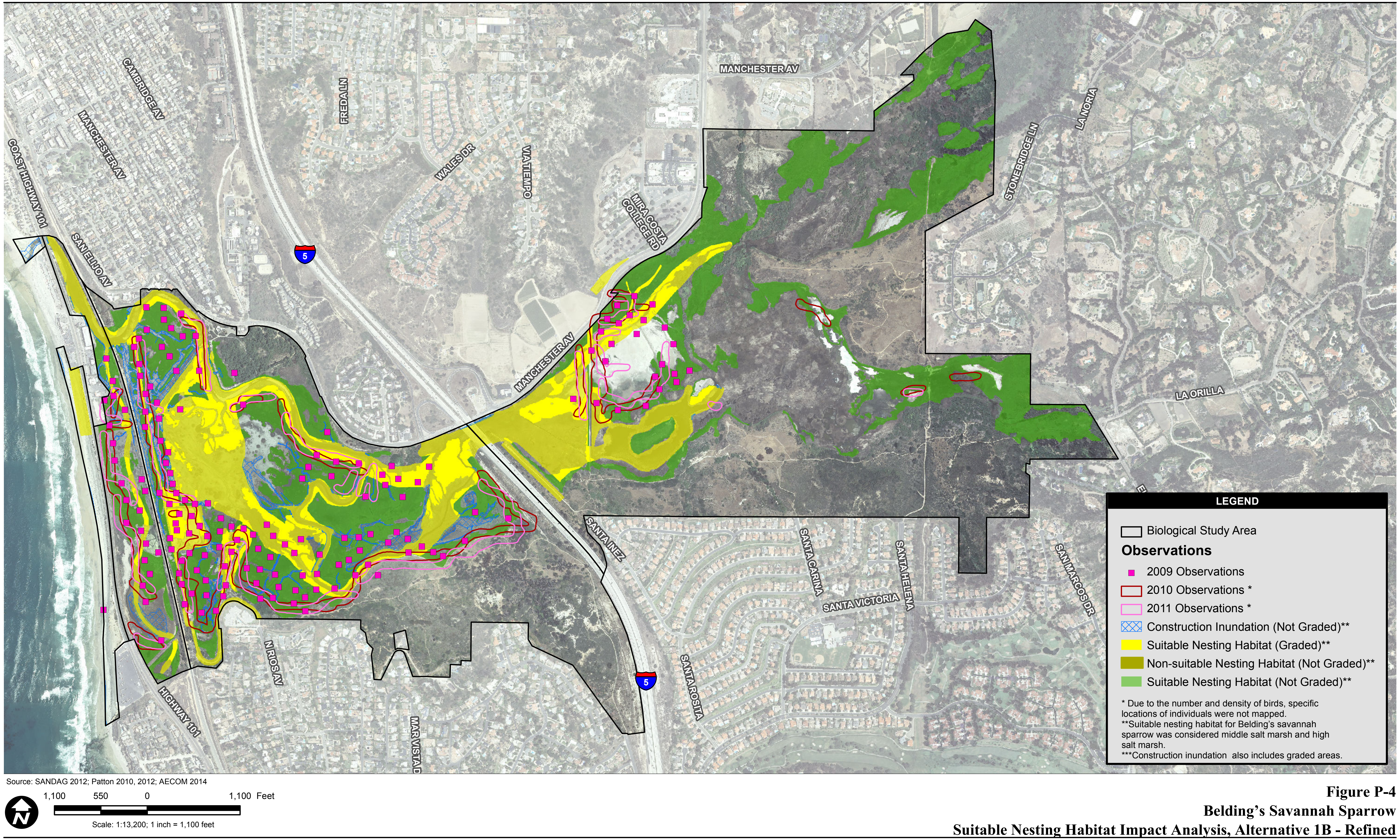

Figure P-4
Belding's Savannah Sparrow
Suitable Nesting Habitat Impact Analysis, Alternative 1B - Refined

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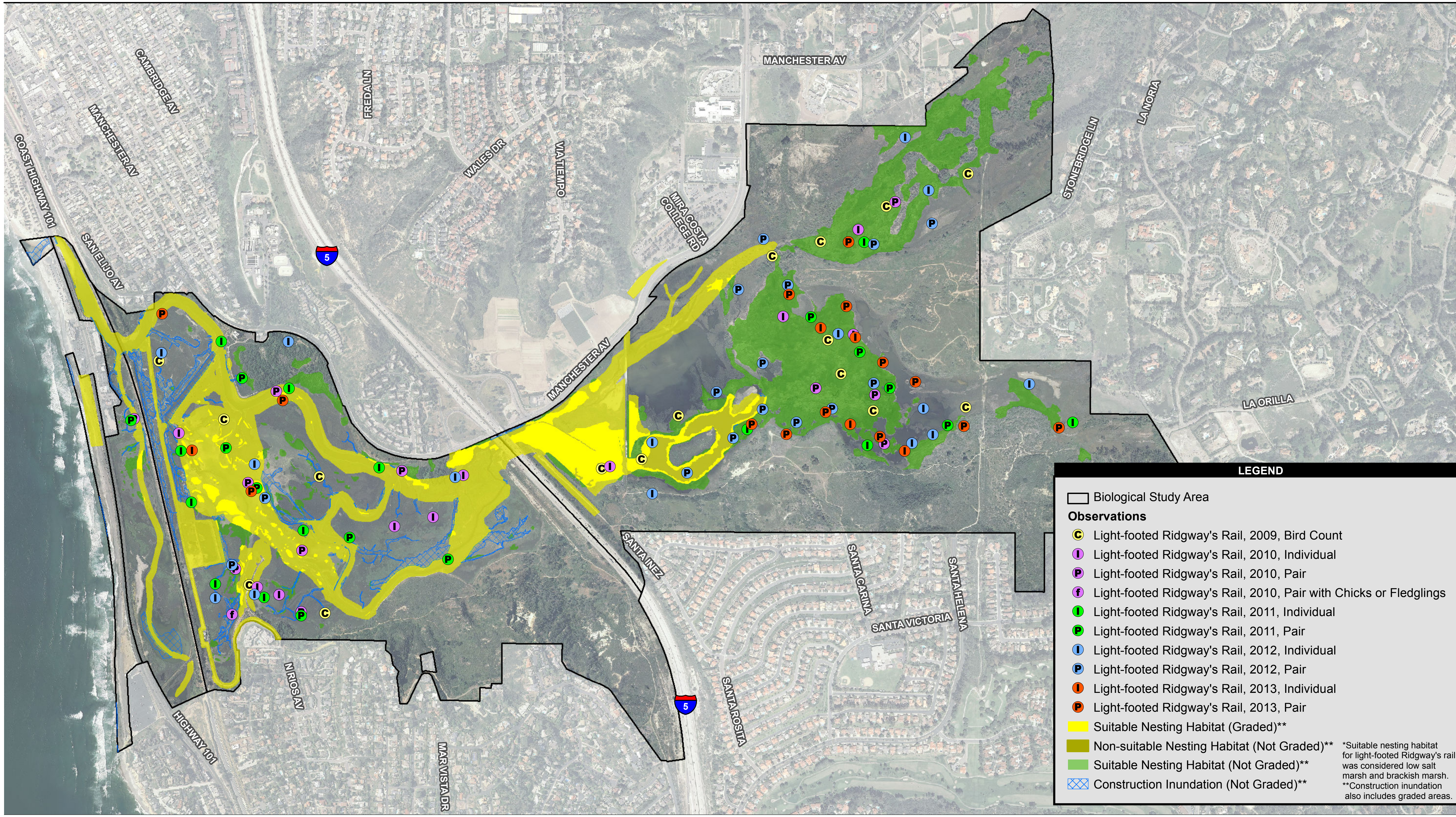

Source: SANDAG 2012; Zembal 2011, 2012; AECOM 2014

1,100 550 0 1,100 Feet

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

Figure P-5

Light-footed Ridgway's Rail

Suitable Nesting Habitat Impact Analysis, Alternative 1B - Refined

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Table P-5
Alternative 1B – Refined Impacts to Suitable Habitat for Listed Bird Species

Species	Habitat Suitability*	Habitat Type	Existing Habitat	Direct Impact to Existing Habitat		Inundation Direct Impact to Existing Habitat		Total Direct Impact to Existing Habitat	
			Acres	Acres	Percent	Acres	Percent	Total Acres	Total Percent
light-footed Ridgway's rail	Nesting/Foraging	Coastal Brackish Marsh	131.5	21.5	16%	0.0	0%	21.5	16%
		Coastal Salt Marsh – Low	13.3	5.9	44%	0.6	5%	6.5	49%
		Total Nesting	144.8	27.4	19%	0.6	0%[1]	28.0	19%
	Foraging	Mudflats	63.1	27.4	43%	11.5	18%	38.9	62%
		Coastal Salt Marsh – Mid	141.4	40.1	28%	1.5	1%	41.6	29%
		Coastal Salt Marsh – High	120	10.5	9%	0.0	0%	10.5	9%
		Total Foraging	324.5	78.0	24%	13.0	4%	91.0	28%
California least tern	Nesting	Salt Panne	36.9	5.0	14%	0.0	0%	5.0	14%
		Coastal Strand	5	0.0	0%	0.0	0%	0.0	0%
		Nesting Area**	0	0.0	0%	0.0	0%	0.0	0%
		Total Nesting	41.9	5.0	12%	0.0	0%	5.0	12%
	Foraging	Subtidal/Channels	40.1	30.9	77%	5.6	14%	38.8	97%
		Beach	15	2.1	14%	0.2	1%	2.3	16%
		Total Foraging	55.1	33.1	60%	5.8	11%	41.2	75%
western snowy plover	Nesting	CDFW Dike	0.4	0.4	100%	0.0	0%	0.4	100%
		Salt Panne	36.9	5.0	14%	0.0	0%	5.0	14%
		Coastal Strand	5	0.0	0%	0.0	0%	0.0	0%
		Nesting Area**	0	0.0	0%	0.0	0%	0.0	0%
		Total Nesting	42.3	5.4	13%	0.0	0%	5.4	13%
	Foraging	Mudflats	63.1	27.4	44%	11.5	18%	38.9	62%
		Beach	15	2.1	14%	0.2	1%	2.3	16%
		Total Foraging	78.1	29.7	38%	11.7	15%	41.2	53%
coastal California gnatcatcher	Nesting/Foraging	Diegan Coastal Sage Scrub	178.1	3.0	2%	0.0	0%	3.0	2%
		Diegan Coastal Sage Scrub/Chaparral	49.3	0.0	0%	0.0	0%	0.0	0%
		Coyote Bush Scrub	7.5	0.0	0%	0.0	0%	0.0	0%
		Total Nesting/Foraging	234.9	3.0	1%	0.0	0%	3.0	1%
least Bell's vireo	Nesting/Foraging	Sandbar Willow Scrub	9	0.0	0%	0.0	0%	0.0	0%
		Southern Willow Scrub	61.4	2.1	3%	0.0	0%	2.1	3%
		Total Nesting/Foraging	70.4	2.1	3%	0.0	0%	2.1	3%
southwestern willow flycatcher	Nesting/Foraging	Southern Willow Scrub	61.4	2.1	3%	0.0	0%	2.1	3%
		Total Nesting/Foraging	61.4	2.1	3%	0.0	0%	2.1	3%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – Mid	141.4	40.1	28%	1.5	1%	41.6	29%
		Coastal Salt Marsh – High	120	10.5	9%	0.0	0%	10.5	9%
		Total Nesting	261.4	50.6	19%	1.6	1%	52.1	20%
	Foraging	Coastal Salt Marsh – Low	13.3	5.9	44%	0.6	5%	6.5	49%
		Total Foraging	13.3	5.9	44%	0.6	5%	6.5	49%

Table P-6
Alternative 1B – Refined Existing and Post-Construction Acreage of Suitable Habitat for Listed Bird Species

Species	Habitat Suitability*	Habitat Type	Existing Habitat Acres	Habitat Acreage Post-Restoration	Net Change in Habitat Acreage Post-Restoration	Alternative 1B – Refined Percent Change Post-Restoration	Alternative 1B Percent Change Post-Restoration (from Table 3.6-11)
light-footed Ridgway's rail	Nesting/Foraging	Coastal Brackish Marsh	131.5	101	-30.5	-23%	-25%
		Coastal Salt Marsh – Low	13.3	50	36.7	276%	283%
		Total Nesting	144.8	151	6.2	4%	4%
	Foraging	Mudflats	63.1	66	2.9	5%	13%
		Coastal Salt Marsh – Mid	141.4	105	-36.4	-26%	-31%
		Coastal Salt Marsh – High	120	125	5	4%	3%
		Total Foraging	324.5	296	-28.5	-9%	-10%
California least tern	Nesting	Salt Panne	36.9	32	-4.9	-13%	-19%
		Coastal Strand	5	5	0	0%	0%
		Nesting Area**	0	2	2	200%	200%
		Total Nesting	41.9	39	-2.9	-7%	-12%
	Foraging	Subtidal/Channels	40.1	63	22.9	57%	67%
		Beach	15	15	0	0%	0%
		Total Foraging	55.1	78	22.9	42%	49%
western snowy plover	Nesting	CDFW Dike	0.4	0	-0.4	-100%	-100%
		Salt Panne	36.9	32	-4.9	-13%	-19%
		Coastal Strand	5	5	0	0%	0%
		Nesting Area**	0	2	2	200%	200%
		Total Nesting	42.3	39	-3.3	-8%	-13%
	Foraging	Mudflats	63.1	66	2.9	5%	13%
		Beach	15	15	0	0%	0%
		Total Foraging	78.1	81	2.9	4%	10%
coastal California gnatcatcher	Nesting/Foraging	Diegan Coastal Sage Scrub	178.1	173.6	-4.5	-3%	-3%
		Diegan Coastal Sage Scrub/Chaparral	49.3	49.3	0	0%	0%
		Coyote Bush Scrub	7.5	7.5	0	0%	0%
		Total Nesting/Foraging	234.9	230.4	0	0%	-2%
least Bell's vireo	Nesting/Foraging	Sandbar Willow Scrub	9	9	0	0%	-1%
		Southern Willow Scrub	61.4	59.1	-2.3	-4%	-5%
		Total Nesting/Foraging	70.4	68.1	-2.3	3%	-4%
southwestern willow flycatcher	Nesting/Foraging	Southern Willow Scrub	61.4	59.1	-2.3	-4%	-5%
		Total Nesting/Foraging	61.4	59.1	-2.3	-4%	-5%
Belding's savannah sparrow	Nesting	Coastal Salt Marsh – Mid	141.4	105	-36.4	-26%	-31%
		Coastal Salt Marsh – High	120	125	5	4%	3%
		Total Nesting	261.4	230	-31.4	-12%	-15%
	Foraging	Coastal Salt Marsh – Low	13.3	50	36.7	276%	283%
		Total Foraging	13.3	50	36.7	276%	283%

NOISE

Grading/dredging and other construction noise and vibration associated with Alternative 1B – Refined would be as described in Section 3.12. Although slightly less material would be graded/dredged (920,000 cy), proportionally more of the work would be completed with low-pressure earth-moving equipment compared to a dredge under Alternative 1B – Refined. Noise from that equipment would be similar to noise generated by earth-moving equipment identified in Section 3.12; therefore, as described in that section, noise levels would not exceed the 75 dBA L_{eq}(8) construction noise level limit established by the cities or County. Temporary noise impacts associated with Alternative 1B – Refined would remain similar to those disclosed for Alternative 1B in Section 3.12. No mitigation is available to reduce CEQA impacts to below a level of significance, as described in Section 3.12.

SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

The impacts of Alternative 1B – Refined on existing regional population and associated housing, employment rates, and regional economy would remain unchanged from those described in Section 3.13. Permanent and temporary noise impacts related to socioeconomics and environmental justice under Alternative 1B – Refined would remain the same as those disclosed for Alternative 1B in Section 3.13.

PUBLIC SERVICES AND UTILITIES

As discussed in Section 3.14, restoration activities within the lagoon for Alternative 1B – Refined would require the grading/dredging, removal, and backfill of large quantities of material. The quantity of material associated with Alternative 1B – Refined would be 920,000 cy, which is reduced from approximately 1.2 mcy under Alternative 1B. The nature of these construction activities would not require substantial use of public utilities and would not result in the development of the types of facilities that could result in the need for new systems, supply, or infrastructure. There would be no substantial increase in the amount of construction debris, and no additional strain would be placed on County landfill facilities. Permanent and temporary impacts to public services and utilities associated with Alternative 1B – Refined would remain the same as those disclosed for Alternative 1B in Section 3.14.

HAZARDOUS MATERIALS AND PUBLIC SAFETY

Habitat distributions under Alternative 1B – Refined would include an increase in open water areas/tidal channels (63 acres proposed) and mudflat habitat (66 acres proposed) within the lagoon compared to existing conditions (40 and 63 acres, respectively). Most of the increase in open water/tidal channels and mudflat habitat would occur in the central and east basins. Conditions during and after construction are anticipated to be better for mosquito control than under current conditions. Implementation of Alternative 1B – Refined would facilitate the control of vectors at the lagoon and reduce the public health and safety risk associated with vector-borne diseases. Permanent and temporary impacts related to hazardous materials and public safety associated with Alternative 1B – Refined would remain similar to those disclosed for Alternative 1B in Section 3.15. Mitigation would reduce CEQA impacts to below a level of significance.

GLOBAL CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

Construction emissions for Alternative 1B are disclosed in Section 3.16, and construction emissions under Alternative 1B – Refined would be incrementally less as discussed above under Air Quality. San Elijo Lagoon will be subject to climate change regardless of the alternative implemented. Alternative 1B – Refined would include areas of 10 acres of higher elevation (e.g., man-made transitional areas) intended to transition from upland to wetland under sea level rise. As conversion occurs, habitat distribution within the lagoon would shift in a slightly different way than discussed in Section 3.16, due to differences in post-restoration habitat distributions. Table P-7 identifies predicted habitat distributions under Alternative 1B – Refined by year 2065, assuming a sea level rise of 2 feet. This predicted distribution is relatively speculative, however, as it accounts for only sea level rise, which is one of many anticipated components of climate change. Other trends, such as changes in rainfall and weather patterns, are extremely difficult to predict and are not considered in this projected future habitat distribution.

Figure P-6 illustrates the generalized habitat distribution change over time (from existing conditions to 2065) with sea level rise. Permanent and temporary impacts related to global climate change and GHG emissions under Alternative 1B – Refined would remain similar to those analyzed for Alternative 1B in Section 3.16. Available mitigation measures would be implemented, but CEQA impacts would remain significant and unavoidable.

CUMULATIVE IMPACTS

In compliance with CEQA and NEPA Guidelines, Chapter 5 identified potential cumulative impacts that could occur from the incremental effects of implementation of the SELRP. As discussed in Chapter 5 for Alternative 1B, Alternative 1B – Refined would have significant cumulative impacts to biological resources, visual resources, traffic, air quality, noise, and global climate change and GHG emissions under CEQA. Substantial cumulative adverse effects (NEPA) would result for biological resources, visual resources, and traffic. The reduction in

Table P-7
Approximate Future Habitat Distribution (2065) under Sea Level Rise

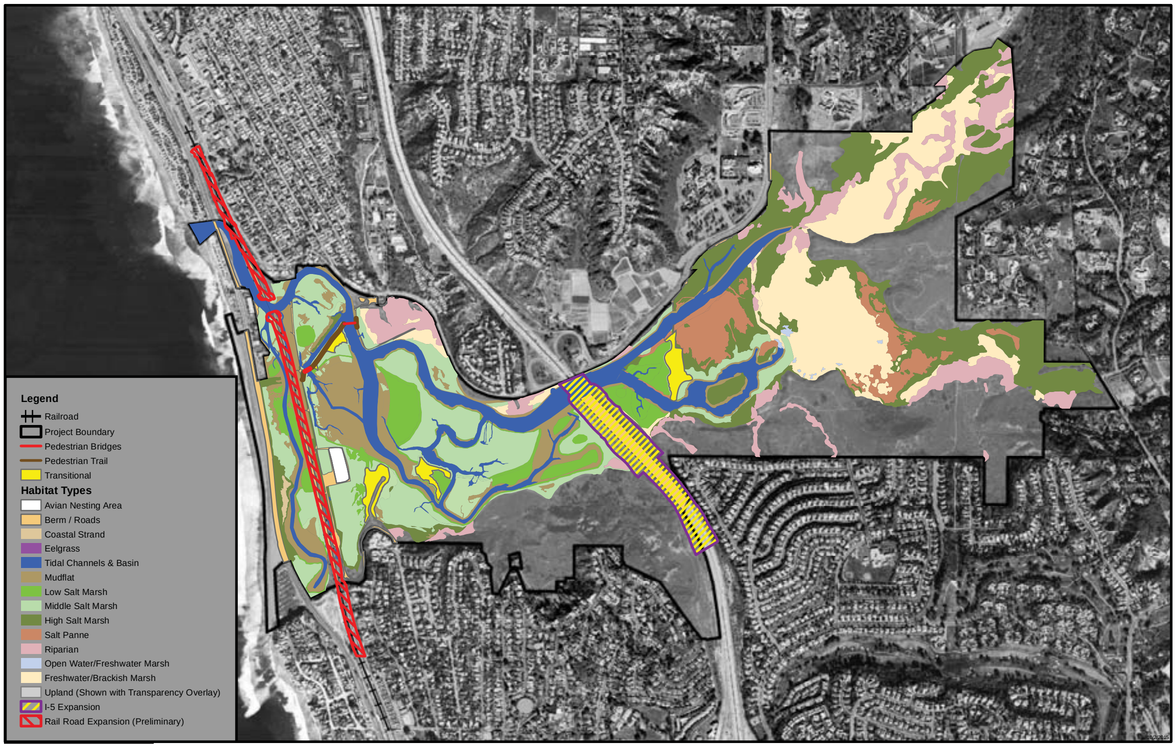
Habitat Type	Alternative 1B (Acres)		Alternative 1B – Refined (Acres)		No Project/ No Federal Action (Acres)	
	Post-Restoration	2065	Post-Restoration	2065	Equilibrium	2065
Avian Nesting Areas	2	2	2	2	0	0
Mudflat	71	147	66	152	29	161
Low-Marsh	51	75	50	82	51	55
Mid-Marsh	98	77	105	73	107	69
High-Marsh (Tidal)	44	36	45	42	47	24
High-Marsh (Non-Tidal)	80	67	80	67	120	107
Salt Panne	30	2	32	2	37	5
Freshwater/Brackish Marsh	99	64	101	64	131	87
Open Water/Tidal Channels and Basins	67	94	63	82	24	48
Riparian	67	55	67	55	71	60
Coastal Strand	5	1	5	1	5	1
Upland & Others	295	301	295	301	299	304
Beach	15	15	15	15	15	15
Berms and Roads	24	23	24	23	23	23
Transitional (man-made)	12	1	10	1	0	0
Subtotal – Tidally Influenced Area[1]	331	429	329	431	258	357
Subtotal – Non-Tidally Influenced Area[2]	629	531	631	531	710	611
Total Area[3]	960	960	960	962	960	960

1 Tidally influenced areas include open water/tidal channels and basins, mudflat, low-marsh, mid-marsh, and high-marsh (tidal).
2 Non-tidally influenced areas include avian nesting area, high-marsh (non-tidal), salt panne, freshwater/brackish marsh, riparian, coastal strand, upland and others, beach, berms and roads, and transitional (man-made).
3 Totals may not add due to rounding.

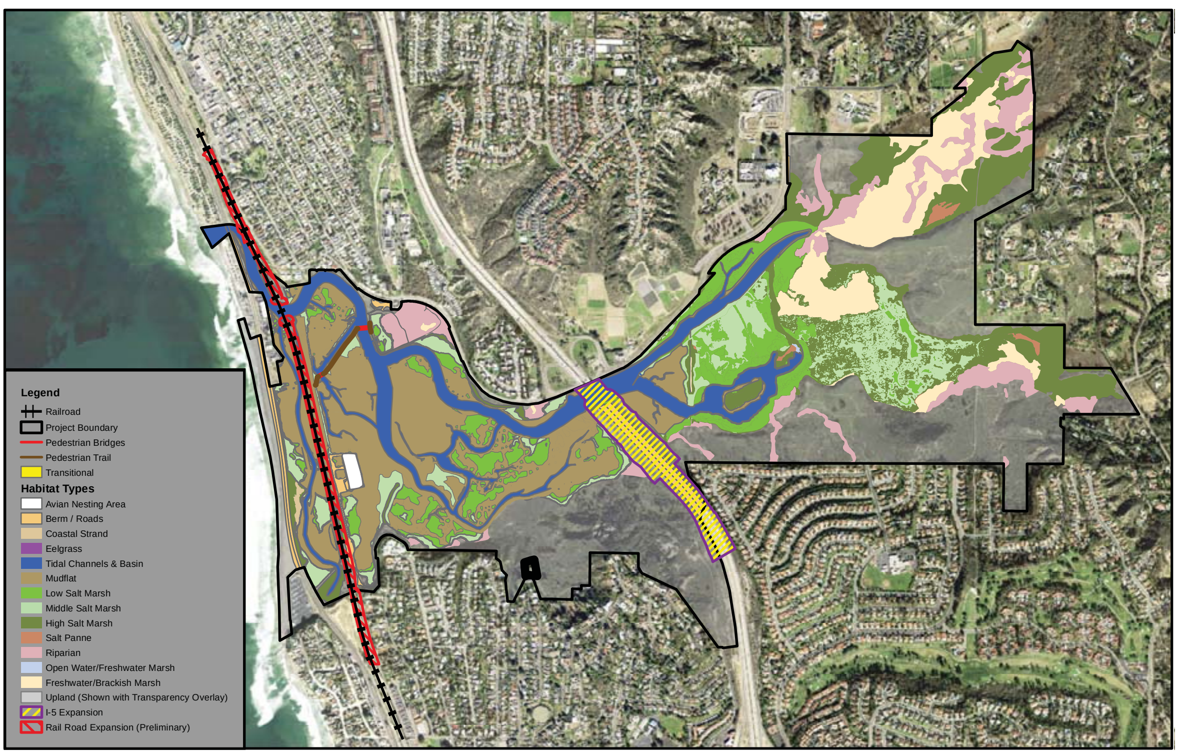
inundation, graded/dredged area, and associated materials to be disposed would have incrementally less contribution to these significant cumulative impacts, but would not eliminate them entirely. The same is true for cumulative adverse impacts.

SUMMARY OF ENVIRONMENTAL EFFECTS

Table P-8 presents a summary of the environmental impacts that would result from Alternative 1B and Alternative 1B – Refined, required mitigation measures, and CEQA level of significance after implementation of mitigation.



Modeled Post-Restoration Conditions



Modeled 2065 Conditions

Figure P-6
Alternative 1B - Refined Generalized Habitat Distribution with Sea Level Rise

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Table P-8
Summary of Environmental Effects

	Alternative 1B	Alternative 1B - Refined	Mitigation Measure	CEQA Level of Significance after Mitigation
Land Use and Recreation				
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Hydrology				
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	No impact	No impact	None required	N/A
Oceanography/ Coastal Processes				
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Water and Aquatic Sediment Quality				
Lagoon Restoration	CEQA: Because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/ siltation, the temporary turbidity that would be generated by lagoon restoration activities, most specifically the dredging operations would be considered a potentially significant impact. NEPA: Not substantially adverse	CEQA: Because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/ siltation, the temporary turbidity that would be generated by lagoon restoration activities, most specifically the dredging operations would be considered a potentially significant impact. NEPA: Not substantially adverse	*Required (CEQA) for Alternative 1B and Alternative 1B - Refined.* Water Quality – 1: All additional conditions, BMPs, and requirements that are identified by regulatory agencies prior to project initiation as part of the permitting process for the project, including Section 404 permit, Coastal Development Permit, Section 1601 permit, Section 401 Water Quality Certification, and the NPDES MS4 permit must be implemented. Compliance with those permit conditions would be monitored through the construction monitoring program and the contractor shall certify to the engineer of record that they have been completed. Water Quality – 2: Turbidity levels shall be actively managed by using a cutterhead dredge and/or temporarily closing the lagoon inlet. The overdredge pit shall be capped with sand material to encapsulate material and prevent it from introducing turbidity or pollutants into the water column or released into the environment. The contractor shall certify to the permit holder that the dredge operations are not responsible for release of sediments into the water column at levels resulting in increased downstream sedimentation.	CEQA: Less than significant
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Geology and Soils				
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Biological Resources				
Lagoon Restoration	CEQA and NEPA: Construction would result in greater than 50 percent temporal loss of sensitive habitats including coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats and a significant and substantially adverse short-term direct impact and cumulative impact would result.	CEQA and NEPA: Construction would result in greater than 50 percent temporal loss of sensitive habitats including open water and tidal mudflats and a significant and substantially adverse short-term direct impact and cumulative impact would result.	*Required for Alternative 1B and Alternative 1B - Refined.* Feasible mitigation not available.	CEQA: Significant and unavoidable
	CEQA and NEPA: Belding’s savannah sparrow is a year-round resident that would experience temporary loss of greater than 50 percent of their nesting habitat. This would result in a significant and substantially adverse short-term direct impact result.	CEQA: Less than significant NEPA: Not substantially adverse.	*Required for Alternative 1B* Feasible mitigation not available.	CEQA: Significant and unavoidable (Alternative 1B only)
	CEQA and NEPA: Construction noise could negatively affect breeding and foraging behavior and would result in a significant and substantially adverse direct and cumulative impact.	CEQA and NEPA: Construction noise could negatively affect breeding and foraging behavior and would result in a significant and substantially adverse direct and cumulative impact.	*Required for Alternative 1B and Alternative 1B - Refined.* Feasible mitigation not available.	CEQA: Significant and unavoidable
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required.	N/A
Cultural Resources				
Lagoon Restoration	CEQA: Accidental disturbance to nearby cultural resources could occur during construction use of the existing access road near sites CA-SDI-13903 and CA-SDI-20,816 and result in a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance to nearby cultural resources could occur during construction use of the existing access road near sites CA-SDI-13903 and CA-SDI-20,816 and result in a potentially significant impact. NEPA: Not substantially adverse	*Required (CEQA) for Alternative 1B and Alternative 1B - Refined.* Cultural-5: Exclusionary fencing shall be used to avoid inadvertent disturbance of cultural resources in proximity to the APE, staging areas, and access roads. The temporary exclusionary fencing shall be placed parallel to, but outside of the APE, staging areas, or the access road’s existing limits of disturbance in locations where within 15	CEQA: Less than significant

	Alternative 1B	Alternative 1B - Refined	Mitigation Measure	CEQA Level of Significance after Mitigation
			feet. Specifically, exclusionary fencing shall be placed parallel to existing access roads used for construction access near site CA-SDI-13903.	
	CEQA: Accidental disturbance of unknown buried human remains during ground disturbance would result in a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance of unknown buried human remains during ground disturbance would result in a potentially significant impact. NEPA: Not substantially adverse	*Required (CEQA) for Alternative 1B and Alternative 1B - Refined.* Cultural-4: If human remains are encountered during the proposed project: • Work at that location will be suspended and redirected elsewhere. • Corps and County DPR will be immediately notified of the discovery. • Remains will be left in place and exclusionary fencing will be placed in a 50-foot radius around the discovery. • Under the provisions of the California PRC Section 7050.5, the County Coroner will be notified in the event of discovery of human remains. • If the remains are either determined to be or there is reason to believe they are Native American, the coroner will notify the NAHC within 24 hours. • Disposition of Native American human remains on non-federal lands is within the jurisdiction of the NAHC. The Corps and County DPR, as lead agencies for the proposed project, will initiate consultation with the NAHC. As part of the consultation process, the NAHC will notify persons most likely to be descended (MLD) from the remains. No ground-disturbing work will occur in the location of the remains until consultation between the NAHC, MLD, Corps, and County DPR has been completed, and notification by the Corps and County DPR that construction activities may resume. • If the remains are discovered in situ, they will be left in place and covered with weather-proof materials such as a tarp or plywood. If they are discovered in spoils, the remains will be placed in a labeled bag and, on approval by the MLD, transported to a secure locked container. An osteologist or a forensic anthropologist will, in consultation with the MLD, inspect fragmentary bones that are suspected to be human but cannot be identified as such in the field.	CEQA: Less than significant
Materials Disposal	No impact	No impact	None required	N/A
Paleontological Resources				
Lagoon Restoration	CEQA: Accidental disturbance of paleontological resources could occur during construction in areas with subsurface potential and is a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance of paleontological resources could occur during construction in areas with subsurface potential and is a potentially significant impact. NEPA: Not substantially adverse	*Required (CEQA) for Alternative 1B and Alternative 1B - Refined.* Paleo-1: A monitoring program during grading, trenching, or other excavation into undisturbed substratum or deeper bedrock beneath the soil horizons and a fossil recovery program shall be implemented per County mitigation standards for excavation equal to or greater than 2,500 cy in high or moderate potential areas. A County-approved paleontologist shall be contracted to perform paleontological resource monitoring and a fossil recovery program if significant paleontological resources are encountered during grading, trenching, or other excavation into undisturbed rock layers beneath the soil horizons in proximity to the Delmar Formation along the North Rios Avenue access road. The following shall be completed: • A County-approved paleontologist shall perform the monitoring (and recovery, if necessary, and report preparation) duties pursuant to the most current version of the County of San Diego Guidelines for Determining Significance for Paleontological Resources. The contract provided to the County shall include an agreement that the grading/ trenching/excavation monitoring will be completed. The contract shall include a cost estimate for the monitoring work and reporting. • The cost of the monitoring shall be bonded. Paleo-2: A final Paleontological Resource Mitigation Report that documents the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program shall be prepared, if excavation into the Delmar Formation occurs and monitoring is required.	CEQA: less than significant
Materials Disposal	No impact	No impact	None required	N/A
Visual Resources				
Lagoon Restoration	CEQA and NEPA: Construction activities would result in a direct temporary and cumulative significant and substantial adverse change in the visual quality and character of the lagoon.	CEQA and NEPA: Construction activities would result in a direct temporary and cumulative significant and substantial adverse change in the visual quality and character of the lagoon.	*Required for Alternative 1B and Alternative 1B - Refined.* Visual-1: Temporary screening would be placed around construction areas that are secured with a chain-link fence (such as booster pumps, staging areas, etc., as shown in Figure 2-15) to provide visual screening of the equipment located within the secured area. Screening could be brown or green mesh or other similar screening material attached to the fencing that would visually hide or obscure the interior of the fenced areas. The screening would extend as high as the chain-link fence, which would range from approximately 6 to 10 feet, depending on the area being secured.	CEQA: Significant and unavoidable
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A

	Alternative 1B	Alternative 1B - Refined	Mitigation Measure	CEQA Level of Significance after Mitigation
Traffic and Circulation				
Lagoon Restoration	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant temporary direct and cumulative traffic impact due to capacity reductions causing traffic operations to degrade from LOS A to LOS F on a segment of Coast Highway 101, south of Chesterfield Drive.	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant temporary direct and cumulative traffic impact due to capacity reductions causing traffic operations to degrade from LOS A to LOS F on a segment of Coast Highway 101, south of Chesterfield Drive.	*Required for Alternative 1B and Alternative 1B - Refined.* Traffic-1: Prepare work zone traffic control plans for lane closures and related construction along Coast Highway 101. The work zone traffic control plans shall be prepared in accordance with the California Manual of Uniform Traffic Control Devices (CAMUTCD), Caltrans Standard Plans (2010), and current standards and best practices of the reviewing and approving agencies. These plans are intended to accommodate workers within the roadway, while facilitating continued circulation for road users (motorists, bicyclists, and pedestrians including persons with disabilities in accordance with the ADA) through the work zone. Traffic-2: Provide advanced notification to motorists that delays and traffic congestion will occur during bridge construction and retrofitting activities to encourage avoidance of the construction area. This notification may be accomplished through various measures such as information and detour routes included on the project website; traffic details included in all 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.	CEQA: Significant and unavoidable
	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant direct and cumulative traffic impact due to reduction in capacity and the subsequent redistribution of northbound traffic to I-5 via Lomas Santa Fe Drive, causing traffic operations to degrade from LOS E to LOS F on a segment of Lomas Santa Fe Drive from Solana Hills Drive to I-5.	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant direct and cumulative traffic impact due to reduction in capacity and the subsequent redistribution of northbound traffic to I-5 via Lomas Santa Fe Drive, causing traffic operations to degrade from LOS E to LOS F on a segment of Lomas Santa Fe Drive from Solana Hills Drive to I-5.	See Traffic-1 and Traffic-2.	CEQA: Significant and unavoidable
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Air Quality				
Lagoon Restoration	CEQA: Construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds and result in a significant direct and cumulative impact. NEPA: Not substantially adverse	CEQA: Construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds and result in a significant direct and cumulative impact. NEPA: Not substantially adverse	*Required (CEQA) for Alternative 1B and Alternative 1B - Refined.* AQ-1: Off-road construction diesel engines not registered under ARB's Statewide Portable Equipment Registration Program that have a rating of 50 horsepower (hp) or more, shall meet, at a minimum, the Tier 3 California Emissions Standards, unless such an engine is not available for a particular item of equipment. Tier 2 engines will be allowed on a case-by-case basis when the Contractor has documented that no Tier 3 equipment or emissions equivalent retrofit equipment is available for a particular equipment type that must be used to complete construction. Documentation shall consist of signed written statements from at least two construction equipment rental firms. AQ-2: Harbor craft with a Category 1 or 2 marine engine, such as tugboats used for materials disposal, shall meet, at a minimum, EPA Tier 2 marine engine emission standards. AQ-3: Dredging equipment shall be electric, if determined by the contractor to be feasible, based on availability and cost. AQ-4: Contractors shall use alternative fueled (e.g., compressed natural gas [CNG], liquefied natural gas [LNG], propane), or electric-powered construction equipment where, if determined by the contractor to be feasible, based on availability and cost. AQ-5: The following measures shall be implemented by the construction contractor to reduce fugitive dust emissions associated with off-road equipment and heavy-duty vehicles: • Exposed surfaces (e.g., unpaved access roads) shall be watered, as necessary, to control fugitive dust. • Sweepers and water trucks shall be used to control dust and debris at public street access points. • Dirt storage piles shall be stabilized by chemical binders, tarps, fencing, or other suppression measures. • Provide sufficient perimeter erosion control to prevent washout of silty material onto public roads. • Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling. Enforce a 15-mph speed limit on unpaved surfaces.	CEQA: Significant and unavoidable
Materials Disposal	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	N/A	N/A
Noise				
Lagoon Restoration	CEQA: Noise impacts associated with nighttime dredging would be significant. NEPA: Not substantially adverse	CEQA: Noise impacts associated with nighttime dredging would be significant. NEPA: Not substantially adverse	No feasible mitigation measures available.	CEQA: Significant and unavoidable
Materials Disposal	CEQA: Noise impacts associated with nighttime material placement would be significant NEPA: Not substantially adverse	CEQA: Noise impacts associated with nighttime material placement would be significant NEPA: Not substantially adverse	No feasible mitigation measures available.	CEQA: Significant and unavoidable

	Alternative 1B	Alternative 1B - Refined	Mitigation Measure	CEQA Level of Significance after Mitigation
Socioeconomics and Environmental Justice				
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Public Services and Utilities				
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Hazardous Materials and Public Safety				
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Unforeseen wastes and hazardous materials could be dredged from the lagoon and create a public health hazard from management or disposal and result in a significant impact. NEPA: Not substantially adverse	CEQA: Unforeseen wastes and hazardous materials could be dredged from the lagoon and create a public health hazard from management or disposal and result in a significant impact. NEPA: Not substantially adverse	*Required (CEQA) for Alternative 1B and Alternative 1B - Refined.* HAZ-3: A sediment management plan will be developed and implemented to test dredged materials for proper placement in the overdredge pit or for off-site transport and proper disposal and to be in compliance with local, state, and federal regulations. The plan shall specify that if unknown contamination or other buried hazards are encountered during dredging, procedures must be carried out according to applicable regulations. Any material encountered that appears to contain contaminants will be handled in accordance with local, state, and federal guidelines, and permit conditions.	CEQA: Less than significant
Global Climate Change and Greenhouse Gas Emissions				
Lagoon Restoration	CEQA: Construction-related GHG emissions would exceed the recommended level of significance and result in a significant and adverse cumulative impact. NEPA: Not substantially adverse	CEQA: Construction-related GHG emissions would exceed the recommended level of significance and result in a significant and adverse cumulative impact. NEPA: Not substantially adverse	*Required (CEQA) for Alternative 1B and Alternative 1B - Refined.* GHG-1: On-site material hauling shall be performed with trucks equipped with on-road engines to the extent practicable. GHG-2: Limit deliveries of materials and equipment to the site to off-peak traffic congestion hours to the extent practicable. GHG-3: Restrict material hauling on public roadways to off-peak traffic congestion hours to the extent possible. During construction scheduling and execution minimize, to the extent possible, uses of public roadways that would increase traffic congestion. GHG-4: Use high-efficiency lighting and Energy Star-compliant heating and cooling units. Implement procedures for turning off computers, lights, air conditioners, heaters, and other equipment each day at close of business.	CEQA: Significant and unavoidable
Materials Disposal	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	N/A	N/A

EXECUTIVE SUMMARY

This section begins the updated Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS) published in February 2016. As indicated in the Reader's Guide and Preface, the main body of the document does not evaluate Alternative 1B – Refined, the Preferred Alternative, separately. Rather, the evaluation focuses on the alternatives identified at the time of public review: Alternatives 2A, 1B, and 1A. Alternative 1B – Refined is the Preferred Alternative and represents a reduced alternative as compared to Alternative 1B. For an evaluation of the Preferred Alternative 1B – Refined by issue area, as well as a comparison of potential impacts with Alternatives 2A, 1B, and 1A, please refer to the Preface.

ES-1 BACKGROUND

San Elijo Lagoon is a coastal wetland formed where Escondido and La Orilla creeks meet the Pacific Ocean in the city of Encinitas, San Diego County, California. The lagoon provides habitat for sensitive, threatened, and endangered plants and animals, including resident and migratory wildlife. There are also public recreational opportunities within the San Elijo Lagoon Ecological Reserve (Reserve), including more than 7 miles of hiking trails.

The Reserve is owned and managed by the California Department of Fish and Wildlife (CDFW) – 348 acres; County of San Diego Parks and Recreation Department (County DPR) – 567 acres; and the San Elijo Lagoon Conservancy (SELC) – 62 acres.

Over time, development and infrastructure constraints have affected the lagoon ecosystem and altered the balance of habitats within the lagoon (e.g., between unvegetated and vegetated intertidal habitats). Urbanization within the surrounding Escondido watershed has accelerated freshwater storm flows, generated year-round urban runoff, and increased chemicals and nutrients within the lagoon. The ecological effects of increased runoff have been compounded by water obstructions to and from the Pacific Ocean. These obstructions include an inefficient channel system and lagoon inlet, a weir in the eastern basin, and the three major transportation corridors that perpendicularly traverse the lagoon: Coast Highway 101, the North County Transit District (NCTD) railroad tracks, and Interstate 5 (I-5). These constraints on the hydraulic connection between the ocean and lagoon affect tidal exchange and drainage of freshwater flows. As a result, water surface elevations in the lagoon are different than those of the ocean, and habitat distribution and quality are adversely affected. Such factors have led to a consistent degradation of water quality (e.g., elevated bacteria levels) in the lagoon and adjacent to the lagoon inlet, leading to beach closures during moderate to large storm events that flush accumulated bacteria to the ocean. Water quality issues also occur due to the historic accumulation of nutrients in lagoon sediments, leading to periods of extended eutrophication. Water quality within the lagoon is currently identified under Clean Water Act (CWA) Section 303(d) as impaired for eutrophication, indicator bacteria, and sedimentation.

Removal of high-nutrient sediments and restoration of tidal influence to the lagoon and enhancing freshwater fluvial flows out of the lagoon would restore the physical (soils and hydrology) and biological (biogeochemical/water quality and habitat) functions that have been degraded over the years. For the lagoon environment to be highly productive, it must be consistently replenished with water and nutrients from the ocean. Regular tidal action also promotes improved water quality.

Historically, the Southern California Bight (between Point Conception and San Diego) contained much more coastal estuarine habitat than current conditions. One of the key recommendations of recent historic ecology studies is to use historic information as a foundation for framing current restoration efforts, while taking into consideration current pressures, land use patterns, and potential future climate change (Sutula et al. 2014; Beller et al. 2014). While a return to historic conditions is not the purpose of the San Elijo Lagoon Restoration Project (SELRP), the historic lagoon environment can provide a basis for understanding potential enhancement activities. In the 19th century, San Elijo Lagoon consisted primarily of salt flats (more than 50 percent), with a smaller proportion of open water and mudflats (Beller et al. 2014). The lagoon faces different pressures today that did not occur in the past, such as increased water and sediment delivery, linear infrastructure constraints, and past activities such as waste discharge. Each of the project alternatives considered by the SELRP considers both historic and current habitat distributions but is designed to provide a more connected gradient of vegetated estuarine habitats balanced with unvegetated estuarine and open water habitats. Restoration of salt panne is complex, but remnant areas of historic salt panne would be maintained and unvegetated intertidal foraging opportunities provided by an increased emphasis on mudflats compared to existing conditions. Habitat gradients that include both vegetated and unvegetated intertidal areas are critical to enhance and restore wetland functions and services at the lagoon level.

Historic evidence suggests that San Elijo Lagoon was once a primarily perennially open system, prior to substantial man-made intervention. However, under the more developed conditions that characterize the lagoon currently, the negative effects of inlet closure have been documented (similar to many southern California lagoons and estuaries). Prolonged inlet closure has led to impoundment of freshwater and high biological oxygen demand, which have resulted in mass die-offs of fish and invertebrate populations from osmotic shock and low dissolved oxygen. Prolonged submergence of salt marsh plant species has led to their repeated temporary demise and promoted the establishment and spread of freshwater species.

Efforts have been made since the mid-1990s to actively manage the lagoon. The San Elijo Lagoon Enhancement Plan (County of San Diego 1996) identified several opportunities for enhancement and restoration, mostly by reducing sedimentation and improving tidal exchange and circulation. A long-term financial endowment was established in the late 1990s to actively fund inlet maintenance for tidal flushing. As a result of this endowment, the SELC has actively opened the inlet on at least an annual basis for more than 10 years, and the lagoon inlet has remained open over 80 percent of the time over that period. These management efforts improved habitat and water quality relative to the stagnant conditions that previously developed when the inlet was closed for prolonged periods. Other efforts involving removal of invasive species also resulted in some improvement to habitat quality. Although important, these efforts do not remedy the underlying hydraulic inefficiencies or loss of functional mudflat habitat within the lagoon.

Restoration of tidal influence to the lagoon and enhancing freshwater fluvial flows out of the lagoon, in conjunction with removal of sediments with historically accumulated nutrients, would restore the physical (soils and hydrology) and biological (biogeochemical/water quality and habitat) functions and services that have been degraded over the years.

The SELRP (proposed project) is an effort to restore lagoon functions and services to the extent practicable given the constraints of surrounding development. The SELRP has evolved over a number of years and has involved many lagoon stakeholders. This environmental document considers several restoration alternatives resulting from those efforts.

Lagoon functions, including water quality, hydraulic function, and biology, are interrelated and dependent upon each other. Implementation of the SELRP would result in certain trade-offs in terms of temporary impacts to achieve the positive long-term benefits of improved lagoon functions and services. While restoration activities would temporarily affect emerging habitats (e.g., low-marsh in the central basin), long-term water quality benefits would improve lagoon function as a whole and ultimately result in a more connected gradient of balanced habitat types that can be maintained for the long term; improved lagoon hydraulics, such as decreased water residence time resulting in decreased bacterial levels; hydrologic connectivity and sediment budget for the nearshore littoral zone; and others.

A number of infrastructure improvements are planned within the lagoon by other agencies. These include double-tracking the railroad tracks extending through the lagoon as part of the Los Angeles to San Diego Proposed Rail Corridor Improvements (LOSSAN) project and replacement of the I-5 bridge as part of the North Coast Corridor Project, proposed by the San Diego Association of Governments (SANDAG) and the California Department of Transportation (Caltrans), respectively. 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. Consistent with Senate Bill 468 (Kehoe), I-5 and railroad bridge improvements over the lagoon would occur concurrently with the SELRP. These bridges are not part of the lagoon restoration project, and the environmental analysis for these projects proposed (and constructed) by others is addressed in other documents (SCH #2002031067/SCH#2004101076).

A Public Works Plan (PWP)/Transportation and Resource Enhancement Program (TREP) was prepared by Caltrans and SANDAG to address comprehensive, system-wide improvements in this coastal corridor. The plan identifies mitigation and enhancement actions including completion of bicycle and pedestrian connections, trail improvements, new and improved transportation facilities, habitat restoration, and compensatory mitigation projects that would provide “functional lift” to coastal resources. The PWP/TREP identifies restoration of San Elijo Lagoon and/or Buena Vista Lagoon as opportunities. The SELRP will be designed to be consistent with the parameters of the North Coast Corridor Project Restoration Enhancement and Mitigation Program (REMP). The stated intent is to improve ecological health and hydrological connectivity, as well as enhance critical coastal resources and habitats.

Additionally, the existing Coast Highway 101 bridge has seismic deficiencies and needs to be retrofitted. While bridge improvements are not a part of the lagoon restoration project, and would be implemented by others, the potential environmental impacts of the retrofit are disclosed in this document.

ES-2 PROJECT DESCRIPTION

The SELRP has two components: the restoration of San Elijo Lagoon and the disposal or reuse of materials excavated as part of the restoration.

Lagoon Restoration

The SELRP would restore San Elijo Lagoon with improved ecological function. The lagoon study area is composed of approximately 960 acres, primarily within the Reserve, and separated into four areas:

- east basin (east of I-5),
- central basin (between NCTD tracks and I-5),
- west basin (between Coast Highway 101 and NCTD tracks), and
- coastal area (between Pacific Ocean and NCTD tracks).

The SELRP would reconfigure lagoon elevations via grading/dredging and modify water flow into the lagoon via changes to the ocean inlet and lagoon channels. Elevations would be created to allow for appropriate inundation frequencies that would support specific habitat types. Generally, habitats range in decreasing elevation from mid- to high-saltmarsh, to low-saltmarsh, to intertidal mudflats, and finally to subtidal (submerged) lands. Reconfiguring the lagoon would be accomplished by dredging in some areas, which would remove high-nutrient sediments that cause eutrophication in the lagoon. In the process of sediment removal, the project would lower elevations and reuse dredged material to create other areas. An example is placement of dredged material into wetland to create upland transitional areas to supplement existing natural transitional areas located around the lagoon perimeter. This helps increase the lagoon's resiliency to future sea level rise. Additionally, some excavated material would be used to create a nesting area in the central basin. Soils within mudflat areas would be native soils lowered slightly in elevation or dredged soils placed on the sand cap over the overdredge pit. This approach would leave exposed mudflat soils that are native marsh soils containing native infauna. The project would also reconfigure or retrofit existing Coast Highway 101 over the inlet of the lagoon, depending on the alternative. While it is anticipated that retrofit work of the existing inlet would be implemented by others, the design and environmental analysis for the work is addressed in this document.

Actions and construction methods specific to each alternative are more fully described below in Section ES-5 Proposed Action and Alternatives.

<u>Materials Disposal/Reuse</u>

Restoration of the lagoon has the potential to generate more than 1 million cubic yards (mcy) of excess material through dredging operations. Various options are available for disposal or reuse of that material (e.g., offshore ocean and/or upland placement or disposal, placement on the beach or nearshore, and reuse on-site), depending on its characteristics. These disposal and reuse options are shown in Figure ES-1. Two alternatives would involve an overdredge pit in the central basin, which would provide better-quality sand for beach replenishment or nearshore placement, while accommodating disposal of finer-grained/poor-quality material on-site. This approach would also enable the project to remove nutrient-rich sediments in the lagoon.

Materials Disposal/Reuse sites are as follows:

- Offshore disposal at LA-5 (permitted ocean dumping area)
- Offshore stockpiling at SO-5/SO-6 (two nearby sand placement sites used for prior regional beach nourishment projects)
- Nearshore (inside littoral cell) at Cardiff

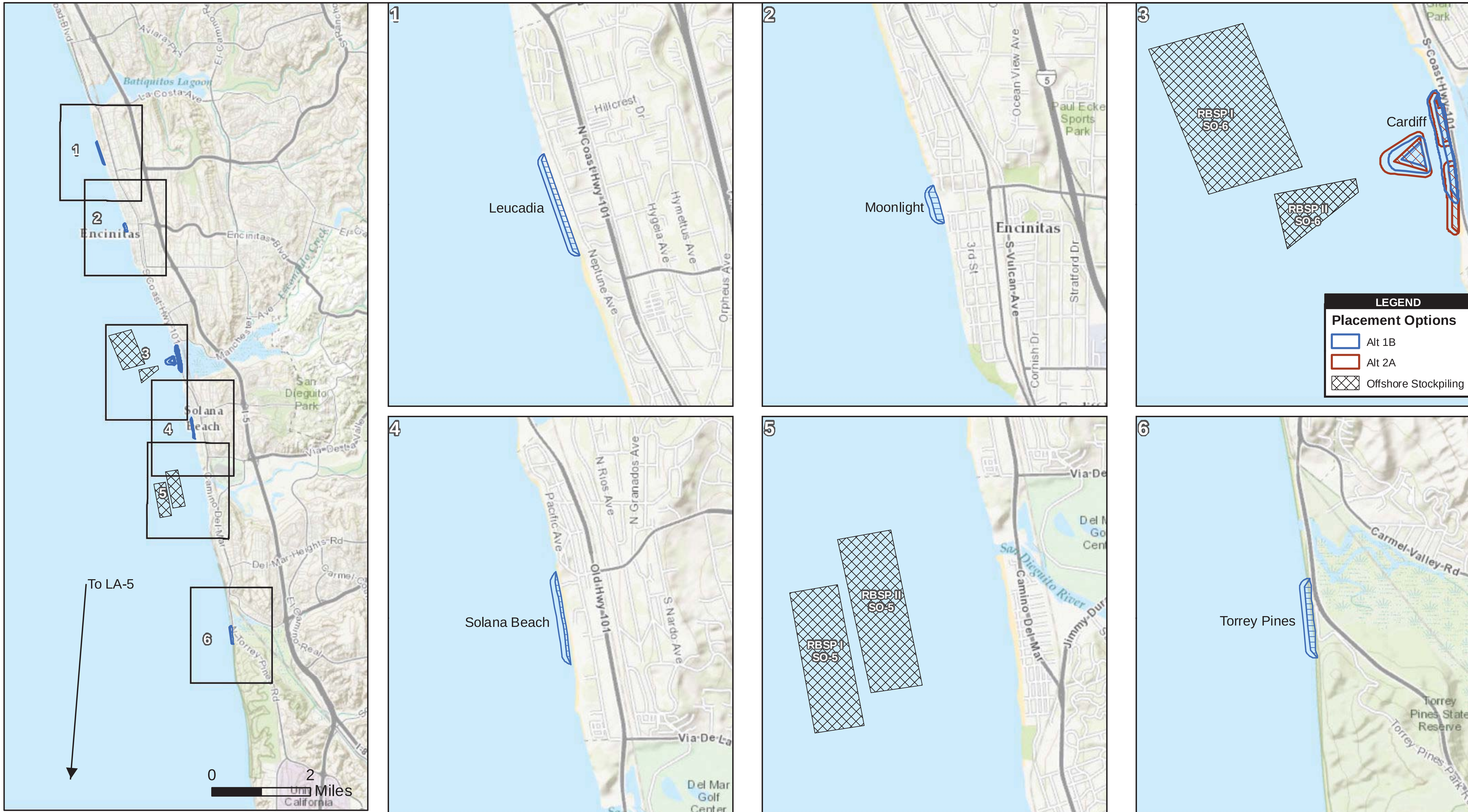
- Onshore Beach placement at nearby beaches
    - Cardiff
    - Leucadia
    - Moonlight
    - Solana Beach
    - Torrey Pines
- On-site fill to create the transition areas and underlying the nesting area

ES-3 LEAD AGENCIES ROLES AND RESPONSIBILITIES

The proposed project requires evaluation pursuant to both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) because of federal, state, and local discretionary actions. The U.S. Army Corps of Engineers (Corps) is the federal lead agency responsible for compliance with NEPA and County DPR is the lead agency responsible for compliance with CEQA. Given the proposed project's complexity and range of potentially significant issues, the appropriate environmental document is a combined EIR/EIS. The Corps and County DPR have agreed to jointly prepare this EIR/EIS to address the federal, state, and local requirements for environmental analysis and permitting. Each lead agency, along with other responsible and trustee agencies, has various permitting authority, environmental documentation certification/approval, and project approval responsibilities.

Restoration of the lagoon would require issuance of a Department of the Army permit from the Corps and a Water Quality Certification from the San Diego Regional Water Quality Control Board pursuant to Sections 404 and 401 of the CWA for discharge of fill materials into waters of the U.S. In addition, the project requires authorization/permit pursuant to Section 10 of the Rivers and Harbors Act for work in navigable waters, and, potentially, Section 103 of the Marine Protection, Research, and Sanctuaries Act for ocean disposal. The Corps is required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for potential impacts on federally endangered or threatened species and their designated critical habitat, and with NMFS pursuant to the Magnuson-Stevens Act for potential impacts to Essential Fish Habitat (EFH). Accordingly, these regulatory and wildlife entities have key interests in the proposed project.

County DPR is part owner of the Reserve and manages it in coordination with the SELC and CDFW. As owner, the County will issue a right-of-entry permit for implementation of the project, and will certify the EIR in compliance with CEQA. Upon certification, the County will issue Findings and a Statement of Overriding Considerations, as necessary, with issuance of the Notice of Determination (NOD).



Source: Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community; SanGIS 2012; MoffattNichol 2012

2,500 1,250 0 2,500 Feet

Scale: 1 = 30,000; 1 inch = 5,000 feet

Figure ES-1
Potential Offsite Materials Placement Sites

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ES-4 PURPOSE AND NEED AND PROJECT GOALS

Over the past several decades, the lagoon system has gradually degraded due to the expansion of urban development within the upstream watershed. This development has altered the hydrology and water quality and, subsequently, the physical and biological functions of the lagoon system. Water quality has decreased due to nutrient accumulation in lagoon sediments, lack of circulation in the lagoon, and sedimentation in areas of impounded water. Habitats within the lagoon have been rapidly converting to habitats with greater freshwater influence. If measures are not taken to improve lagoon water quality and hydrology, muted tidal exchange, nutrients bound in sediment, and restricted water circulation will continue to degrade the physical and biological functions of the lagoon. Freshwater marsh and higher elevation salt marsh habitats will likely continue to expand and dominate the system, at the expense of unvegetated intertidal habitats. Water quality issues will continue to cause eutrophication and low dissolved oxygen conditions during certain periods of the year. Sensitive plant and animal species currently dependent on the aquatic and intertidal habitats within the lagoon would be adversely affected by these conditions.

The NEPA purpose of the proposed project, as well as the Corps' overall project purpose, is to enhance and restore the physical and biological functions and services of San Elijo Lagoon by increasing hydraulic efficiency in the lagoon, addressing existing water quality impairments, and halting ongoing conversion of unvegetated wetland habitats to support a more connected gradient of balanced habitat types.

The overall CEQA goal to protect and restore, then maintain via adaptive management, the San Elijo Lagoon ecosystem and its adjacent uplands can be further refined into four categories of objectives:

1. Physical restoration of lagoon estuarine hydrologic functions
2. Biological restoration of habitat and species within the lagoon
3. Management and maintenance to ensure long-term viability of the restoration efforts
4. Maintain recreational and educational opportunities

ES-5 PROPOSED ACTION AND ALTERNATIVES

Over the life of the project, various options for restoration of the lagoon have been considered, as well as various options for disposal of material dredged from the lagoon. Each of the alternatives evaluated would restore lagoon functions and services through dredging and grading to create a connected gradient of habitats.

All four alternatives identified in this document are analyzed at an equal level of detail:

- Alternative 2A
- Alternative 1B
- Alternative 1A
- No Project/No Federal Action Alternative

Alternative 2A

This alternative, shown in Figure ES-2, would improve tidal action by constructing a new inlet south of the existing inlet. The new inlet would require stabilization through the incorporation of cobble blocking features (CBFs) at the beach and development of a “prefilled ebb bar” located in the nearshore area outside of the new outlet location. A new bridge along Coast Highway 101 would also be constructed to span the proposed new inlet location, and would incorporate a dedicated pedestrian sidewalk for access along the shoreline. The increased tidal action from the new inlet would also create a more connected gradient of balanced habitat types than presently exist.

With this alternative, a new subtidal basin would be created just landward of the new inlet in the west and central basins to capture sediment entering the lagoon. The main tidal channel would be widened and redirected just west of I-5, and would then extend into the east basin. The southern channel and secondary channels within the central basin would also be improved by providing connections to the main channel along the east and west ends of the secondary channels, and providing a more gradual habitat gradient along channel banks (e.g., subtidal to mudflat to vegetated marsh). The existing channel in the east basin would be widened from 130 to 261 feet and the existing weir would be removed. These actions would promote more tidal exchange east of I-5 and allow more freshwater flows to exit the lagoon. Dredging, particularly in the central basin, would remove nutrients bound in lagoon sediments that can lead to eutrophication. Man-made transitional habitat would be created by filling on top of, and alongside, the remnants of the weir. This habitat is intended to provide refugia in the form of continually transitioning habitat over time as sea level rises. Three other areas of transitional habitat above tidal elevations would be created in the central basin. Together, these would supplement the natural transitional habitat occurring in a band around the perimeter of the lagoon. A former sewage settling pond in the central basin would be filled and capped with sand and crushed shell for use as a nesting area.

The primary change in habitat distributions under Alternative 2A would be an increase in open water areas/tidal channels and mudflat habitat within the lagoon compared to existing conditions. Open water areas and tidal channels would be increased in all three lagoon basins compared to existing conditions. Mudflat and open water/tidal channels would be actively created throughout the central basin and replace existing mid-marsh and low-marsh habitat. Similarly, open water/tidal channels and low-marsh would be actively created in the east basin where freshwater/brackish

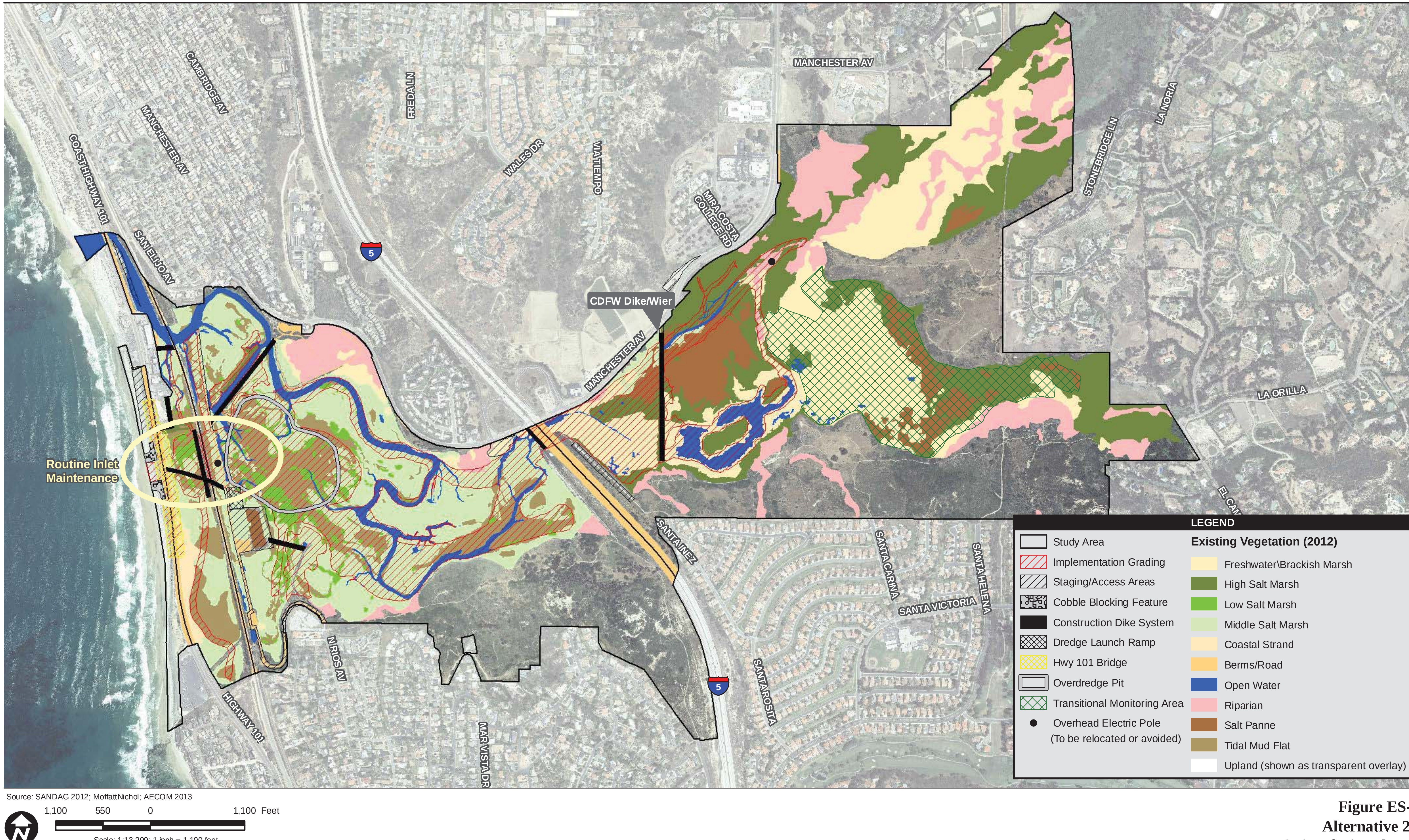

Figure ES-2
Alternative 2A
Limits of Disturbance

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marsh currently exists. Increases to estuarine habitat (low-, mid-, and high-marsh) may also occur as a result of conversion of salt panne and freshwater/brackish marsh in the far east basin as tidal expression increases.

Alternative 2A would involve overexcavation of the proposed sedimentation basin so that poor-quality material (e.g., fine-grained) could be buried in an “overdredge” pit and covered with a sand cap. The good-quality (e.g., larger-grained) material from the overdredge pit in the central basin would then be available for beneficial reuse. It is anticipated that approximately 1.4 mcy of material would be exported for reuse for the initial implementation of Alternative 2A. Approximately 500,000 cubic yards (cy) of this sand material from the overdredge pit would be placed in the ocean nearshore, west of the proposed inlet location to “prefill” the anticipated ebb bar that would form off the inlet.

Alternative 2A would require a new Coast Highway 101 bridge at the new inlet location. The new bridge would not increase vehicular capacity along Coast Highway 101, but it would include a separated pedestrian walkway on the west side of the structure to ensure north-south pedestrian and bicycle access. Changes to the I-5 and NCTD crossings would be implemented by others, but changes to Coast Highway 101 are included in the proposed project. Bridge improvements at the I-5 crossing, as planned by Caltrans, would lengthen and deepen the existing channel opening. The NCTD railroad would remain in place and another bridge constructed by NCTD to span the proposed inlet, although the channel underneath the existing railroad tracks would require deepening for improved hydraulics as part of the LOSSAN Project. Rock armoring would be installed at all three features to provide channel bank and bridge abutment protection and prevent undermining by increased tidal/fluvial flows.

The nearshore zone off San Elijo Lagoon contains a high volume of cobbles and the proposed new inlet would minimize cobble migration into the lagoon through the use of CBFs. The CBFs would be two relatively short, low rock features along the sides of the tidal inlet channel.

Routine maintenance dredging would be required to maintain appropriate inlet connection to the ocean, and approximately 300,000 cy is anticipated to be dredged from the basin every 3 to 4 years. Maintenance would occur over a period of 5 months and the material is planned for placement on Cardiff Beach south of the new tidal inlet.

<u>Alternative 1B</u>

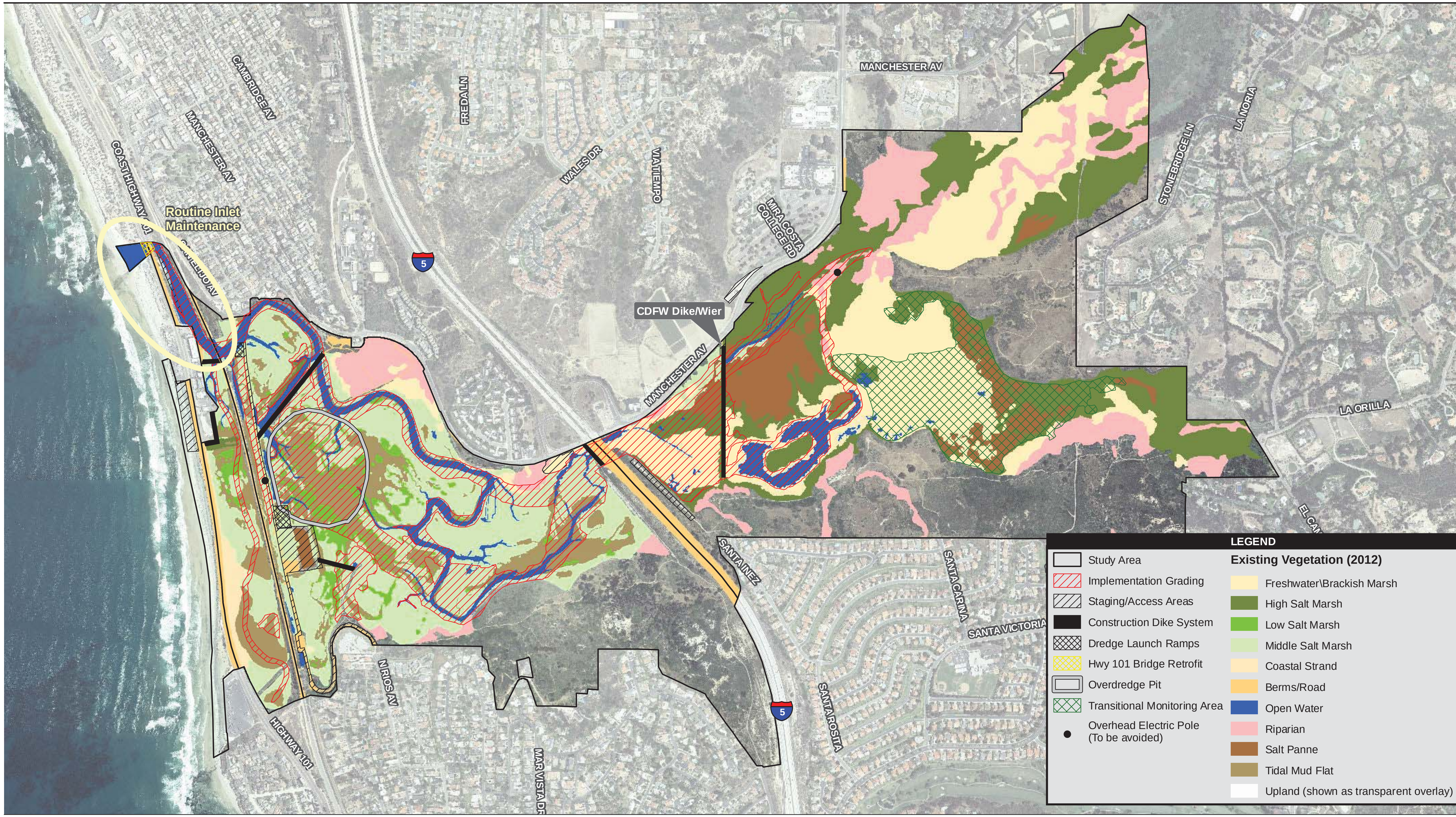
Alternative 1B, shown in Figure ES-3, would create a more connected gradient of balanced habitat types relative to existing conditions through modifications to channels and habitat areas within the lagoon. The existing tidal inlet would remain and no CBFs would be required. The existing Coast Highway 101 bridge structure over the existing inlet would be retained.

Under Alternative 1B, the main tidal channel would be extended and a mix of mudflats and secondary channels created south of the main channel in the central basin. The southern channel and secondary channels within the central basin would also be improved by connecting both east and west ends to the main channel to increase circulation and creating a habitat gradient along channel banks. Existing emergent low-marsh would be retained to the extent possible to create a more connected gradient of balanced habitat types in the basin. Retention of emergent low-marsh would be balanced with the need to remove high-nutrient sediments that currently cause water quality issues, such as eutrophication, in the lagoon.

The main channel would be redirected just west of I-5 and extended farther into the east basin. The channel in the east basin would be widened from 130 to 261 feet and the CDFW dike and weir would be removed; combined, this would promote more tidal exchange east of I-5. The tidal prism of Alternative 1B would be substantially increased compared to existing conditions. Several areas of transitional habitat above tidal elevations would be created in the central basin to supplement the natural transitional habitat that extends around the perimeter of the lagoon. These areas would also offer refugia from sea level rise.

Alternative 1B would result in an increase in open water/tidal channels, low-marsh, mudflat, and created transitional habitat compared to existing conditions. Most of the increase in open water/tidal channels and mudflat habitat would occur in the central and east basins, and would result in a corresponding decrease in mid-marsh, salt panne, and freshwater/brackish marsh habitats. Mudflat soils would consist of native soils lowered slightly in elevation or soils removed from shallow excavation and placed on top of the overdredge pit sand cap. The open freshwater ponds currently maintained by the CDFW weir would be converted to open water/tidal channels and low-marsh habitat.

Alternative 1B assumes bridge improvements at the I-5 crossing, as planned by Caltrans, which would result in the channel under the I-5 bridge being lengthened and deepened. The existing bridges at Coast Highway 101 and the NCTD railroad would remain in place, although the channels underneath would require deepening for improved hydraulics as part of the LOSSAN project (planned for implementation by others, as described in Table ES-1). The seismically deficient existing Coast Highway 101 bridge structure would be retrofitted to current seismic standards, as analyzed in this document. Retrofit work may be implemented by others but is evaluated as part of this project (different than Alternative 2A, which would implement Coast Highway 101 bridge reconstruction). The existing seismic deficiencies of the Coast Highway 101 bridge would not be affected by implementation of Alternative 1B, nor would the bridge’s condition have an effect on the project (M&N 2013; TY Lin 2011). Rock armoring would be



Source: SANDAG 2012; MoffattNichol; AECOM 2013

1,100 550 0 1,100 Feet

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

Figure ES-3
Alternative 1B
Limits of Disturbance

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installed at all three features, in compliance with the owners' design standards, to provide channel bank and bridge abutment protection and prevent undermining by increased tidal/fluvial flows.

Alternative 1B would involve creation of an overdredge pit to provide larger-grained material suitable for reuse within the littoral zone. It is anticipated that approximately 1.2 mcy of material would be exported from the overdredge pit in the central basin for reuse for the initial implementation of Alternative 1B. Similar to Alternative 2A, Alternative 1B would fill the former sewage settling pond in the central basin and cap it with sand and crushed shell for use as a nesting area.

Table ES-1
Overview of Project Elements and Responsible Parties for Construction

Project Element	SELC	Caltrans	NCTD	Other (TBD)
Lengthen I-5 bridge over San Elijo Lagoon		X		
Lengthen railroad crossing over San Elijo Lagoon			X	
Coast Highway 101 bridge (new inlet)	X (Alt. 2A only)			
Seismic retrofit of Coast Highway 101 (existing inlet)				X
Dredge lagoon	X			

Inlet maintenance would require the removal of approximately 40,000 cy of sediment annually, utilizing the same approach as existing inlet management. That maintenance is anticipated to occur in spring (typically April) and require approximately 4 weeks.

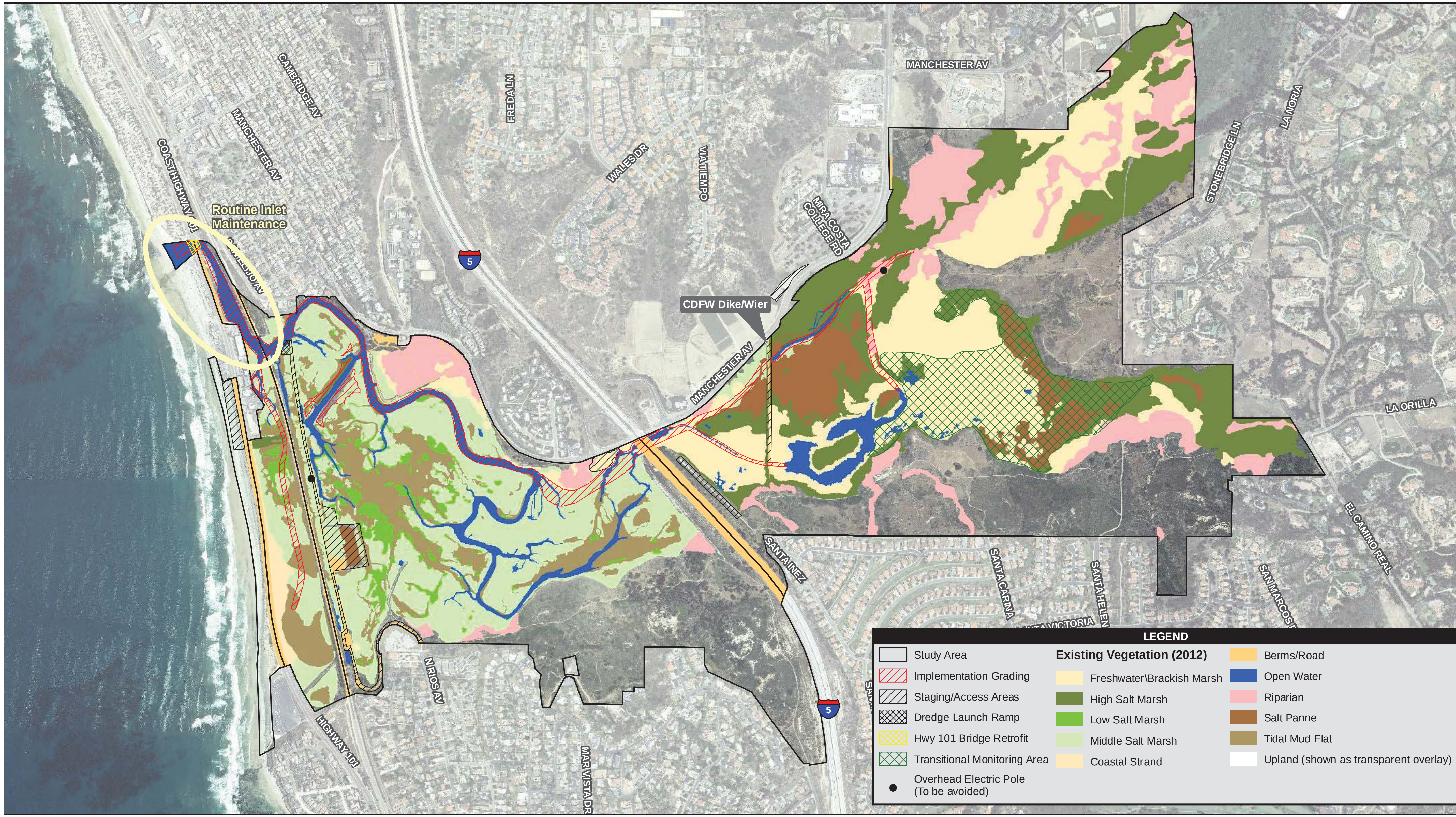
<u>Alternative 1A</u>

Alternative 1A, shown in Figure ES-4, would implement the least physical changes to the lagoon. The main feeder channel throughout the site would be enlarged and redirected just west of I-5. The main tidal channel would be extended farther into the east basin, and existing constricted channel connections would be cleared and enlarged. The existing CDFW dike would be left in place, but two new openings would be created through it to allow tidal and fluvial connections. The tidal prism of Alternative 1A would be slightly increased compared to existing conditions. Existing habitat areas would essentially remain intact, although current conversion trends from unvegetated intertidal habitats to vegetated intertidal habitats would be expected to continue. High-nutrient sediment removal would primarily be limited to the main channel. Some freshwater habitat areas in the east basin are anticipated to convert to more saltwater-based communities due to enhanced tidal influence and the resulting changes in inundation frequencies. One small area of transitional habitat would be constructed in the northwest portion of the central basin.

Alternative 1A habitat distribution would result in a high proportion of mid- and high-marsh habitat. There would be a decrease of mudflat, open water/tidal channels, and freshwater/brackish marsh and an increase of low-marsh and high-marsh habitat compared to existing conditions. This alternative allows the continued conversion of mudflats to low-marsh and some existing freshwater marsh would be converted to high-marsh and open water/tidal channel habitat. Water quality impairments due to nutrient-rich sediments and limited circulation would also continue to occur.

Channels under I-5 and the railroad bridge would be deepened for improved hydraulics (planned for implementation by others). The channel under Coast Highway 101 would also be widened slightly, but replacement of the bridge structure would not be necessary. The existing seismically deficient Coast Highway 101 bridge would be retained and retrofitted to meet current seismic safety standards. Retrofit work may be implemented by others but is evaluated as part of this project (different than Alternative 2A, which would implement Coast Highway 101 bridge reconstruction). All three bridge features would be armored to prevent undermining. Whether or not the bridge is retrofitted to address its existing seismic deficiency, activities associated with the SELRP would have no effect on the bridge itself, nor would the bridge’s condition have an effect on the project (M&N 2013; TY Lin 2011).

Approximately 160,000 cy of material would need to be exported to LA-5 for the implementation of Alternative 1A. Preliminary soil investigations and coordination with the Corps and U.S. Environmental Protection Agency (EPA) suggest the material would be appropriate for disposal at LA-5; however, additional Tier 3 testing and approval from the Corps and EPA would be required prior to disposal. Because dredging would be primarily limited to improving or connecting existing channels under this alternative, no areas large enough to accommodate an overdredge pit would be disturbed and no overexcavation would occur in this scenario. Without an overdredge pit, no large-grained material would be available from dredging and only material unsuitable for reuse as beach or littoral cell nourishment (e.g., fine-grained) would be generated. Alternative 1A would also utilize some material removed from the site to fill the former sewage settling pond in the central basin (approximately 35,000 cy) and cap it with sand and crushed shell for use as a nesting site.



Source: SANDAG 2012; MoffattNichol; AECOM 2013

1,100 550 0 1,100 Feet

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

Figure ES-4
Alternative 1A
Limits of Disturbance

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Inlet maintenance would continue to be performed via existing methods. Approximately 35,000 cy per year would be removed from the inlet and placed either on the adjacent beach or in the nearshore. The process would take approximately 2 weeks and would be anticipated to occur in spring (typically April).

No Project/No Federal Action Alternative

Under this alternative, there would be no dredging or excavation to improve water quality, tidal circulation, channel clearing, or other comprehensive actions to improve tidal exchange or conveyance of freshwater in high flow conditions. The lagoon inlet would remain in its existing location. The present spectrum of environmental constraints would continue to limit the quality and productivity of the lagoon.

Under the No Project/No Federal Action Alternative, conversion from subtidal and mudflat habitat to a system dominated by salt marsh and riparian habitat would continue. This conversion would continue to occur fairly rapidly. Current functioning mudflat is an artifact of past freshwater impoundment and is not at a natural elevation for self-sustainable mudflat. Ultimately, the conversion of another 34 acres of mudflat is anticipated as the lagoon moves toward a state of equilibrium with current water levels and inundation frequencies. In addition, mid-marsh habitat would convert to high-marsh habitat and there would be a loss of open water habitat throughout the lagoon compared to existing conditions. While allowing the lagoon to revert to a more frequently closed-inlet condition could slow or halt this conversion, water quality would then be expected to continue to deteriorate.

Under the No Project/No Federal Action Alternative, no materials would be dredged from the lagoon for the purpose of restoration. However, the practice of active management at the lagoon inlet is expected to continue to maintain tidal exchange with the ocean and allow fluvial flows to exit the lagoon. This exchange, although limited by the existing hydraulic constraints in the lagoon, maintains more acceptable water quality levels in the lagoon than would occur under no management.

Alternatives Comparison

The following tables provide a comparison of alternative characteristics relative to habitat distribution (Table ES-2), material removal volumes (Table ES-3), and materials disposal/reuse location scenarios (Table ES-4).

Table ES-2
Habitat Distribution Comparison for the Alternatives

Habitat Type	Habitat Distribution (acres)[1]				
	Existing	Proposed[2]			
		Alternative 2A	Alternative 1B	Alternative 1A	No Project/ No Federal Action
Avian Islands	0	2	2	2	0
Mudflat	63	102	71	25	29
Low-Marsh	13	23	51	44	51
Mid-Marsh	141	124	98	140	107
High-Marsh	120	107	124	145	167
Saltpan	37	17	30	35	37
Freshwater/Brackish Marsh	132	96	99	121	131
Open Water/Tidal Channels and Basins	40	74	67	34	24
Riparian	72	67	67	70	71
Coastal Strand	5	5	5	5	5
Upland & Others	299	292	295	299	299
Beach	15	14	15	15	15
Berms and Roads	23	24	24	24	23
Transitional (created)	0	12	12	2	0
Total[3]	**960**	**960**	**960**	**960**	**960**

[1] Existing habitat acreages are from 2012 mapping efforts and reflect habitat distributions at that time.
[2] The proposed habitat distribution acreages represent the proposed post-project condition that would result from the implementation of each alternative, and do not take into account future sea level rise.
[3] Totals may not add due to rounding.
Source: Nordby and M&N 2013

Table ES-3
Materials Removal and Periodic Maintenance Comparison for the Alternatives

	Alternative 2A	Alternative 1B	Alternative 1A	No Project/No Federal Action
Initial Amount of Material Removed	1.4 mcy	1.2 mcy	160,000 cy	0
Estimated Post-construction Periodic Volume Dredged	300,000 cy	40,000 cy	35,000 cy	25,000 cy
Estimated Post-construction Periodic Maintenance Frequency	Every 3 to 4 years	Annually	Annually	Annually

mcy = million cubic yards
cy = cubic yards

Table ES-4
Materials Disposal and Beneficial Reuse Scenarios

Approximate Net Quantity of Material: Alternative 1A = 160,000 cy of relatively poor-quality material that is only suitable for offshore disposal at LA-5 Alternative 1B = 1.2 mcy (overdredging would occur to generate appropriate material for beneficial reuse) Alternative 2A = 1.4 mcy (overdredging would occur to generate appropriate material for beneficial reuse)				
Type of Materials Placement	**Potential Disposal Locations**	**Maximum Volumes Proposed for Placement by Site**		
		Alternative 2A and Alternative 1B (cy)		**Alternative 1A (cy)**
Offshore Disposal	LA-5	0		160,000
Offshore Stockpiling (outside littoral cell)	SO-5/SO-6	1,000,000		0
Nearshore (inside littoral cell)	Cardiff	Alternative 2A	Alternative 1B	0
		500,000	300,000	
Onshore (beach placement)	Cardiff	300,000		0
	Leucadia	117,000		0
	Moonlight Beach	105,000		0
	Solana Beach	146,000		0
	Torrey Pines	245,000		0

Notes:

1. Nearshore materials placement quantity at Cardiff is greater in Alternative 2A because a new inlet would require construction of a prefilled ebb bar (Section 2.4).
2. Materials placement quantities exceed amount to be disposed of, or reused, to allow flexibility at individual placement sites.
3. Onshore beach sand placement sites are consistent with the 2012 RBSP (SCH #2010051063) with the exception of Cardiff, which would extend slightly farther north and south along the coastline. Refer to Figure 2-11 for the proposed project's sand placement sites. While 2012 RBSP sites are proposed for use, the SELRP would obtain permits for placement, since the 2012 RBSP was a one-time project implemented in 2012.
4. Sand Compatibility and Opportunistic Use Programs (SCOUP) sites are not included as an option for materials placement in this EIR/EIS because the existing SCOUPs assume construction methods and other conditions that are not consistent with the SELRP (e.g., daytime construction only).

cy = cubic yards
mcy = million cubic yards

Alternative 2A was identified as the proposed project in the Draft EIR/EIS because it would result in the largest level of disturbance. The preliminary Least Environmentally Damaging Practicable Alternative (LEDPA) has been identified as Alternative 1B – Refined, as described in the Preface to this EIR/EIS through the Draft Section 404(b)(1) Alternatives Analysis, which is attached to this Final EIR/EIS as Appendix O. This alternative also represents the CEQA Agency Preferred Alternative and NEPA Environmentally Preferred Alternative subject to a final LEDPA determination that will be in the Record of Decision (ROD) issued by the Corps as part of its review of the project. This Final EIR/EIS continues to evaluate alternatives at an equal level of detail in the event the Final 404(b)(1), Alternatives Analysis, which will be included in the ROD, determines a different LEDPA from Alternative 1B – Refined.

ES-6 OVERVIEW OF AFFECTED ENVIRONMENT

San Elijo Lagoon

San Elijo Lagoon is a coastal wetland with ecological resources that are important to the region, as well as a recreational and visual amenity for the community. The lagoon and adjacent uplands in the Reserve provide habitats that support sensitive species. The lagoon study area is biologically rich with over 20 species of fish, over 20 species of reptiles and amphibians, 24 species of mammals, and over 295 bird species (including 65 nesting), in addition to a complex suite of terrestrial and marine invertebrates. Included are six federally threatened and endangered birds, such as light-footed Ridgway's rail (*Rallus obsoletus levipes*) and least Bell's vireo (*Vireo bellii pusillus*). Biological surveys of the lagoon study area identified one federally listed plant species, Del Mar manzanita (*Arctostaphylos glandulosa* ssp.*crassifolia*); one state-listed plant species, Orcutt's goldenbush (*Hazardia orcuttii*); and 20 additional special-status plants. A mosaic of habitat and ecosystems occurs, from open water to dense freshwater marsh. The existing habitat is linked directly to tidal inundation and frequency.

Materials Disposal/Reuse Areas

In addition to the lagoon study area, the geographical scope of this document includes areas outside of the lagoon that are proposed to be used as disposal/reuse areas for materials excavated from the lagoon, as described below. To date, the proposed disposal/reuse areas have not been approved by the Corps or EPA; however, a Sampling and Analysis Plan (SAP) was prepared for the SELRP (Appendix A). Both the Corps and EPA determined that the testing in the SAP is consistent with the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual (Inland Testing Manual) testing procedures, which address lagoon-dredged material-placement options such as nearshore and onshore placement, direct lagoon placement, or offshore stockpiling at borrow sites within the 3-mile limit from the shore. Additional Tier 1–4 testing may be required prior to Corps and EPA approval of the SAP Results Report. Testing in accordance with the Evaluation of Dredged Material Proposed for Ocean Disposal (Ocean Disposal Manual) has not been completed. Additional Tier 3 testing would be required prior to EPA and Corps approval of any offshore disposal to ensure that the material is suitable and is in compliance with the U.S. Ocean Dumping Regulations.

Offshore Disposal

LA-5 is an ocean disposal site designated by EPA that can be used for the disposal of dredged material from federal projects. It is located in the Pacific Ocean approximately 10 nautical miles offshore and southwest of San Diego Bay.

Offshore Stockpiling

There are two potential offshore placement sites for the proposed project, SO-5 and SO-6. A portion of SO-6 is within 4,000 feet of shore, close enough for material to be delivered to the site via pipeline. While closer to land than LA-5, SO-5 and SO-6 are outside the “depth of closure,” meaning material placed in these offshore locations will not return to the shoreline via natural ocean processes.

Nearshore and Onshore

Cardiff: Sand placement is proposed both in the nearshore ocean and onshore at Cardiff. The Cardiff site onshore is characterized by cobble beaches south of Restaurant Row. The site abuts Coast Highway 101 and is backed primarily by the lagoon. In its entirety, Cardiff State Beach stretches from Cardiff reef south to Seaside reef, encompasses approximately 25 acres, and has 6,550 feet of ocean frontage. The waters off of Cardiff State Beach include popular surf spots and also support commercial fishing, as well as potential kelp harvesting areas.

Leucadia: The beach at this placement site extends approximately 0.5 mile from just south of the Grandview access stairs to Jasper Street. Adjacent land uses are predominantly residential, with some commercial uses along Coast Highway 101. This state beach is operated by the City of Encinitas. Popular and often crowded surf spots are found near the placement site and rocks are a hazard.

Moonlight Beach: The proposed Moonlight Beach placement site is located at the foot of B and C streets at Moonlight State Beach. The proposed site is approximately 770 feet long. Moonlight State Beach is operated by the City of Encinitas and has a wide variety of recreational facilities. The southern part of the site abuts the Encinitas City Marine Life Refuge (California Fish and Game Code Section 10913). Residential uses occur adjacent to the site, to the north and south. The beach area is relatively flat but quickly slopes up to the east, north, and south with multiple popular surf breaks along this reach.

Solana Beach: The proposed placement site in the City of Solana Beach is located just north of Estrella Street and extends approximately 4,700 feet (0.9 mile) south. Steep cliffs abut the placement site and the area consists of a gently sloping sand beach with scattered rocks and cobbles. Residential development and some commercial uses exist along the bluffs above the placement site. The bluffs and beach are severely eroded, and numerous efforts to slow erosion, such as riprap, the filling in of sea caves, engineered in-fills, sea walls, and other revetments occur along the bluffs and beach. Surfing can be popular at this location depending on offshore sand, swell, and tides.

Torrey Pines: The proposed Torrey Pines placement site is located within the jurisdiction of the City of San Diego and California Department of Parks and Recreation. The site stretches for approximately 1,620 feet and is located on Torrey Pines State Beach adjacent to North Torrey Pines Road. Nearby land use includes the open space of Torrey Pines State Beach/Reserve and Los Peñasquitos Lagoon. Riprap has been placed along North Torrey Pines Road to protect it from eroding further. Popular surf breaks in the vicinity are scattered beach breaks of variable quality along Torrey Pines State Beach.

ES-7 ENVIRONMENTAL CONSEQUENCES

The discussion of environmental consequences in this EIR/EIS provides independent analyses of the two project components: lagoon restoration and materials disposal/reuse under both CEQA and NEPA. The four lagoon restoration alternatives and each of the materials disposal/reuse locations are analyzed at an equal level of detail. CEQA conclusions below are identified as significant impacts, while those referencing NEPA conclusions are identified as substantially adverse.

Under CEQA, resources that would result in less than significant or significant impacts that can be mitigated and reduced to less than significant for all alternatives include land use and recreation; hydrology; oceanography/coastal processes; water and aquatic sediment quality; geology and soils; cultural resources; paleontological resources; public services and utilities; and hazards and public safety.

Under NEPA, resources that would result in no substantial adverse effect include land use and recreation; hydrology; oceanography/coastal processes; water and aquatic sediment quality; geology and soils; cultural resources; paleontological resources; air quality; noise; socioeconomics and environmental justice; public services and utilities; and global climate change and greenhouse gases. Substantial adverse impacts would occur to biological resources; visual resources; traffic, access, and circulation; and hazardous materials and public safety.

Table ES-5 at the end of this Executive Summary summarizes the potential effects under each alternative for both CEQA and NEPA and identifies whether those effects can be mitigated.

Significant Unavoidable and Substantial Adverse Impacts

Under both CEQA and NEPA, significant unavoidable and substantial adverse impacts would result to biological resources due to temporary habitat loss, habitat loss effects on Belding's savannah sparrow (under Alternative 2A and Alternative 1B), and construction noise effects on bird species (under Alternative 2A, Alternative 1B, and Alternative 1A). Mitigation is provided but would not reduce impacts to less than significant.

Under both CEQA and NEPA, significant unavoidable and substantial adverse impacts would result to visual resources due to temporary construction activities throughout the lagoon under Alternative 2A and Alternative 1B. Mitigation is provided but would not reduce impacts to less than significant. Permanent significant unavoidable and substantial adverse impacts due to placement of CBFs (Alternative 2A only) would also result, and feasible mitigation is not available.

Under both CEQA and NEPA, significant unavoidable and substantial adverse impacts would result temporarily to traffic conditions on segments of Coast Highway 101 and Lomas Santa Fe Drive due to Coast Highway 101 bridge construction (under Alternative 2A) or retrofitting activities (under Alternative 1B and Alternative 1A). Mitigation is provided but would not reduce impacts to less than significant.

During construction, under CEQA, significant unavoidable air quality impacts would result from equipment emissions for Alternative 2A, Alternative 1B, and Alternative 1A. Significant unavoidable air quality impacts would result from operational maintenance activities associated only with Alternative 2A. Mitigation is provided but would not reduce impacts to less than significant.

Under CEQA, significant unavoidable nighttime noise impacts would result from dredging and materials placement activities proposed 7 days a week, 24 hours a day. Noise thresholds limiting sound levels to 75 A-weighted decibels equivalent noise level during a 24-hour period would not be exceeded. However, due to proposed dredging outside of permitted daytime hours, variances would be required from the cities of Encinitas and Solana Beach and the County. With issuance of a variance, 24-hour operations could occur. Feasible mitigation is not available.

Under NEPA, the new inlet and associated CBFs would be a permanent project feature onshore and nearshore along Cardiff State Beach and persons who stray too close to these areas may result in injury should they be thrown against the CBFs or swept into the inlet or rip current. Impacts would be significant and substantially adverse. Mitigation is provided to minimize the public safety hazard.

Significant unavoidable CEQA impacts for Alternative 2A, Alternative 1B, and Alternative 1A would result from construction activities to global climate change and greenhouse gas (GHG) emissions. Mitigation is provided but would not reduce impacts to less than significant.

Cumulative Effects

Under CEQA, significant cumulative impacts were identified for six topic areas. Mitigation is proposed where feasible but would not reduce impacts to below a level of significance. Cumulative effects would result to biological resources, visual resources, traffic, air quality, noise, and global climate change and GHG emissions.

Under NEPA, substantial cumulative short-term adverse effects would result for biological resources, visual resources, and traffic.

The majority of the cumulative effects would persist only throughout the duration of the construction period as they are a result of construction-specific actions. Ultimately, these short-term effects would cease to contribute to a cumulative impact. Examples of cumulative effects that would end after construction include disturbance of bird species due to construction noise, nighttime construction noise, visual impacts of construction equipment in the lagoon, traffic congestion due to Coast Highway 101 bridge work, and construction-related pollutant emissions. Permanent cumulative effects would include the ongoing air quality emissions that would result from maintenance activities, under CEQA for Alternative 2A only.

For GHG emissions due to construction disturbance and equipment, the project adds a considerable contribution to cumulative global climate change. While a single project is unlikely to have a significant impact on global climate change, the cumulative effects of worldwide GHG emissions have been clearly linked to changes in the atmosphere and identified as the main cause of global climate change. The GHG emissions from construction and maintenance activities associated with lagoon restoration and materials disposal/reuse for Alternative 2A and Alternative 1B exceed the significance threshold of 900 metric tons of carbon dioxide equivalent (MT CO_2e) per year used for analysis of this project. Mitigation is provided, but it would not reduce the project's contribution impacts to less than significant. Construction and maintenance GHG emissions for Alternative 1A would not exceed the recommended level of significance.

Table ES-5
Summary of Environmental Effects

	Alternative 2A	Alternative 1B	Alternative 1A	No Action/No Project Alternative	Mitigation Measure	CEQA Level of Significance after Mitigation
Land Use and Recreation						
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Hydrology						
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	No impact	No impact	No impact	No impact	None required	N/A
Oceanography/Coastal Processes						
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Water and Aquatic Sediment Quality						
Lagoon Restoration	CEQA: Because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/siltation, the temporary turbidity that would be generated by lagoon restoration activities, most specifically the dredging operations would be considered a potentially significant impact. NEPA: Not substantially adverse	CEQA: Because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/siltation, the temporary turbidity that would be generated by lagoon restoration activities, most specifically the dredging operations would be considered a potentially significant impact. NEPA: Not substantially adverse	CEQA: Because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/siltation, the temporary turbidity that would be generated by lagoon restoration activities, most specifically the dredging operations would be considered a potentially significant impact. NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Required (CEQA) for Alternative 2A, Alternative 1B, and Alternative 1A.* Water Quality – 1: All additional conditions, BMPs, and requirements that are identified by regulatory agencies prior to project initiation as part of the permitting process for the project, including Section 404 permit, Coastal Development Permit, Section 1601 permit, Section 401 Water Quality Certification, and the NPDES MS4 permit must be implemented. Compliance with those permit conditions would be monitored through the construction monitoring program and the contractor shall certify to the engineer of record that they have been completed. *Required (CEQA) for Alternative 2A and Alternative 1B.* Water Quality – 2: Turbidity levels shall be actively managed by using a cutterhead dredge and/or temporarily closing the lagoon inlet. The overdredge pit shall be capped with sand material to encapsulate material and prevent it from introducing turbidity or pollutants into the water column or released into the environment. The contractor shall certify to the permit holder that the dredge operations are not responsible for release of sediments into the water column at levels resulting in increased downstream sedimentation.	CEQA: Less than significant
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required	N/A
Geology and Soils						
Lagoon Restoration	CEQA: The proposed bridge improvement and channel-deeping portions of Alternative 2A could result in significant impacts from liquefaction, erosion, settlement, and other unstable geologic conditions that could result in a signficant geologic impact. NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: No impact NEPA: Not substantially adverse	*Required (CEQA) for Alternative 2A.* Geology-1: The proposed bridge improvement and channel-deeping portions of the project could result in significant impacts from liquefaction, erosion, settlement, and other unstable geologic conditions. The mitigation of performing geotechnical investigations and implementing site-specific measures recommended in the engineering study to ensure appropriate design for structural stability and reducing unstable geologic conditions is required to reduce impacts to less than significant. After implementation of the measures identified to remediate potentially unstable geologic conditions, certification shall be provided by a California Registered Professional Engineer or Certified Engineering Geologist that states that the measures are in place and the identified liquefaction, erosion, settlement, or other unstable geologic conditions have been adequately remediated to mitigate the potential impact.	CEQA: Less than significant
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: No impact NEPA: Not substantially adverse	None required	N/A

	Alternative 2A	Alternative 1B	Alternative 1A	No Action/No Project Alternative	Mitigation Measure	CEQA Level of Significance after Mitigation
Biological Resources						
Lagoon Restoration	CEQA and NEPA: Construction would result in greater than 50 percent temporal loss of sensitive habitats including coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats and a significant and substantially adverse short-term direct impact and cumulative impact would result.	CEQA and NEPA: Construction would result in greater than 50 percent temporal loss of sensitive habitats including coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats and a significant and substantially adverse short-term direct impact and cumulative impact would result.	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Required for Alternative 2A and Alternative 1B.* Feasible mitigation not available.	CEQA: Significant and unavoidable
	CEQA and NEPA: Belding's savannah sparrow is a year-round resident that would experience temporary loss of greater than 50 percent of their nesting habitat. This would result in a significant and substantially adverse short-term direct impact.	CEQA and NEPA: Belding's savannah sparrow is a year-round resident that would experience temporary loss of greater than 50 percent of their nesting habitat. This would result in a significant and substantially adverse short-term direct impact result.	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Required for Alternative 2A and Alternative 1B.* Feasible mitigation not available.	CEQA: Significant and unavoidable
	CEQA and NEPA: Construction noise could negatively affect breeding and foraging behavior and would result in a significant and substantially adverse direct and cumulative impact.	CEQA and NEPA: Construction noise could negatively affect breeding and foraging behavior and would result in a significant and substantially adverse direct and cumulative impact.	CEQA and NEPA: Construction noise could negatively affect breeding and foraging behavior and would result in a significant and substantially adverse direct and cumulative impact.	CEQA: Less than significant NEPA: Not substantially adverse	*Required for Alternative 2A, Alternative 1B, and Alternative 1A.* Feasible mitigation not available.	CEQA: Significant and unavoidable
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	None required.	N/A
Cultural Resources						
Lagoon Restoration	CEQA: Accidental disturbance to nearby cultural resources could occur during construction use of the existing access road near sites CA-SDI-13903 and CA-SDI-20,816 and result in a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance to nearby cultural resources could occur during construction use of the existing access road near sites CA-SDI-13903 and CA-SDI-20,816 and result in a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance to nearby cultural resources could occur during construction use of the existing access road near sites CA-SDI-13903 and CA-SDI-20,816 and result in a potentially significant impact. NEPA: Not substantially adverse	No impact	*Required (CEQA) for Alternative 2A, Alternative 1B, and Alternative 1A.* Cultural-5: Exclusionary fencing shall be used to avoid inadvertent disturbance of cultural resources in proximity to the APE, staging areas, and access roads. The temporary exclusionary fencing shall be placed parallel to, but outside of the APE, staging areas, or the access road's existing limits of disturbance in locations where within 15 feet. Specifically, exclusionary fencing shall be placed parallel to existing access roads used for construction access near site CA-SDI-13903.	CEQA: Less than significant
	CEQA: Accidental disturbance of unknown buried human remains during ground disturbance would result in a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance of unknown buried human remains during ground disturbance would result in a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance of unknown buried human remains during ground disturbance would result in a potentially significant impact. NEPA: Not substantially adverse	No impact	*Required (CEQA) for Alternative 2A, Alternative 1B, and Alternative 1A.* Cultural-4: If human remains are encountered during the proposed project: • Work at that location will be suspended and redirected elsewhere. • Corps and County DPR will be immediately notified of the discovery. • Remains will be left in place and exclusionary fencing will be placed in a 50-foot radius around the discovery. • Under the provisions of the California PRC Section 7050.5, the County Coroner will be notified in the event of discovery of human remains. • If the remains are either determined to be or there is reason to believe they are Native American, the coroner will notify the NAHC within 24 hours. • Disposition of Native American human remains on non-federal lands is within the jurisdiction of the NAHC. The Corps and County DPR, as lead agencies for the proposed project, will initiate consultation with the NAHC. As part of the consultation process, the NAHC will notify persons most likely to be descended (MLD) from the remains. No ground-disturbing work will occur in the location of the remains until consultation between the NAHC, MLD, Corps, and County DPR has been completed, and notification by the Corps and County DPR that construction activities may resume. • If the remains are discovered in situ, they will be left in place and covered with weather-proof materials such as a tarp or plywood. If they are discovered in spoils, the remains will be placed in a labeled bag and, on approval by the MLD, transported to a secure locked container. An osteologist or a forensic anthropologist will, in consultation with the MLD, inspect fragmentary bones that are suspected to be human but cannot be identified as such in the field.	CEQA: Less than significant
	CEQA: Ground-disturbing excavation at the new Coast	CEQA: Less than significant NEPA: Not substantially	CEQA: Less than significant NEPA: Not substantially	No impact	*Required (CEQA) for Alternative 2A only.*	CEQA: Less than significant

	Alternative 2A	Alternative 1B	Alternative 1A	No Action/No Project Alternative	Mitigation Measure	CEQA Level of Significance after Mitigation
	Highway 101 bridge and inlet where there is the possibility for unknown buried cultural resources in stable sediments could result in a potentially significant impact. NEPA: Not substantially adverse	adverse	adverse		Cultural-1: Implementation of Alternative 2A requires that aan Archaeological Monitoring and Discovery Plan shall be prepared and implemented prior to the start of ground-disturbing activities at the new Coast Highway 101 bridge and inlet to identify areas with the potential for intact cultural deposits and provide protocols in the event archaeological material is encountered during construction of the project. If previously unknown resources are identified during construction, the lines of communication and measures outlined in the Monitoring and Discovery Plan would be followed, including applicable late discovery protocols per Section 106. These measures would include of the NHPA. The Archaeological Monitoring and Discovery Plan shall include but is not limited to the following measures: • Ground-disturbing construction activity shall be temporarily halted by the project archaeologist and/or Native American monitor at the location of the find and redirected elsewhere until the find is assessed by a qualified archaeologist for eligibility to the NRHP and CRHR. • If the find is determined by the project archaeologist in consultation with the Native American monitor to be potentially eligible for the NRHP or CRHR: 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 the Corps and County DPR 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 the Corps and County DPR that activities may resume. o If the resource is located on state lands, the California SLC Assistant Chief Counsel will be informed of the discovery. Evaluation procedures would include: o subsurface excavation (in stable sediments), o cataloging and laboratory analysis of recovered cultural materials, o curation of the artifact collection at an approved regional facility, o preparation of a draft and final technical report pursuant to CEQA and NEPA documenting the discovery and addressing regional research issues, and o consultation with local Native Americans in accordance with Section 106 regarding the significance and treatment of any cultural resources encountered. If any human remains are discovered, the Property Owner or their representative shall contact the County Coroner, the Corps, and the County DPR. Upon identification of human remains, no further disturbance shall occur in the area of the find until the County Coroner has made the necessary findings as to origin. If the remains are determined to be of Native American origin, the Most Likely Descendant (MLD), as identified by the NAHC, shall be contacted by the Property Owner or their representative in order to determine proper treatment and disposition of the remains. The immediate vicinity where the Native American human remains are located is not to be damaged or disturbed by further development activity until consultation with the MLD regarding their recommendations as required by Public Resources Code Section 5097.98 has been conducted. Public Resources Code §5097.98, CEQA §15064.5 and Health & Safety Code §7050.5 shall be followed in the event that human remains are discovered. Cultural-2: Implementation of Alternative 2A requires that cultural resources monitoring shall be required during mechanical excavation associated with the Coast Highway 101 bridge and inlet. A qualified archaeological monitor and Native American representative shall be present during all mechanical excavations in sediments with the potential for NRHP- or CRHR-eligible cultural resources. Cultural-3: Implementation of Alternative 2A requires that a training session for project construction personnel shall be conducted by a qualified archaeologist prior to the start of ground-disturbing activities at the Coast Highway 101 bridge/inlet. The training session shall include a review of required monitoring locations and communication protocols, types of cultural resources that might be encountered, cultural resources responsibilities, protection procedures, and avoidance measures. Cultural-4: If human remains are encountered during the proposed project: • Work at that location will be suspended and redirected elsewhere. • Corps and County DPR will be immediately notified of the discovery. • Remains will be left in place and exclusionary fencing will be placed in a 50-foot radius around the discovery. • Under the provisions of the California PRC Section 7050.5, the County Coroner will be notified in the event of discovery of human remains. • If the remains are either determined to be or there is reason to believe they are Native American, the coroner will notify the NAHC within 24 hours. • Disposition of Native American human remains on non-federal lands is within the jurisdiction of the NAHC. The Corps and County DPR, as lead agencies for the proposed project, will initiate consultation with the NAHC. As part of the consultation process, the NAHC will notify persons most likely to be descended (MLD) from the remains. No ground-disturbing work will occur in the location of the remains until consultation between the NAHC, MLD, Corps, and County DPR has been completed, and notification by the Corps and County DPR that construction activities may resume. • If the remains are discovered in situ, they will be left in place and covered with weather-proof materials such as a tarp or plywood. If they are discovered in spoils, the remains will be placed in a labeled bag and, on approval by the MLD, transported to a secure locked container. An osteologist or a forensic anthropologist will, in consultation with the MLD, inspect fragmentary bones that	

	Alternative 2A	Alternative 1B	Alternative 1A	No Action/No Project Alternative	Mitigation Measure	CEQA Level of Significance after Mitigation
					are suspected to be human but cannot be identified as such in the field. Cultural-5: Exclusionary fencing shall be used to avoid inadvertent disturbance of cultural resources in proximity to the APE, staging areas, and access roads. The temporary exclusionary fencing shall be placed parallel to, but outside of the APE, staging areas, or the access road's existing limits of disturbance in locations where they are within 15 feet. Specifically, exclusionary fencing shall be placed parallel to existing access roads used for construction access near sites CA-SDI-13903.	
Materials Disposal	No impact	No impact	No impact	No impact	None required	N/A
Paleontological Resources						
Lagoon Restoration	CEQA: Accidental disturbance of paleontological resources could occur during construction in areas with subsurface potential and is a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance of paleontological resources could occur during construction in areas with subsurface potential and is a potentially significant impact. NEPA: Not substantially adverse	CEQA: Accidental disturbance of paleontological resources could occur during construction in areas with subsurface potential and is a potentially significant impact. NEPA: Not substantially adverse	CEQA: No impact NEPA: Not substantially adverse	*Required (CEQA) for Alternative 2A, Alternative 1B and Alternative 1A.* Paleo-1: A monitoring program during grading, trenching, or other excavation into undisturbed substratum or deeper bedrock beneath the soil horizons and a fossil recovery program shall be implemented per County mitigation standards for excavation equal to or greater than 2,500 cy in high or moderate potential areas. A County-approved paleontologist shall be contracted to perform paleontological resource monitoring and a fossil recovery program if significant paleontological resources are encountered during grading, trenching, or other excavation into undisturbed rock layers beneath the soil horizons in proximity to the Delmar Formation along the North Rios Avenue access road. The following shall be completed: A County-approved paleontologist shall perform the monitoring (and recovery, if necessary, and report preparation) duties pursuant to the most current version of the County of San Diego Guidelines for Determining Significance for Paleontological Resources. The contract provided to the County shall include an agreement that the grading/trenching/excavation monitoring will be completed. The contract shall include a cost estimate for the monitoring work and reporting. The cost of the monitoring shall be bonded. Paleo-2: A final Paleontological Resource Mitigation Report that documents the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program shall be prepared, if excavation into the Delmar Formation occurs and monitoring is required.	CEQA: less than significant
Materials Disposal	No impact	No impact	No impact	No impact	None required	N/A
Visual Resources						
Lagoon Restoration	CEQA and NEPA: Construction activities would result in a direct temporary and cumulative significant and substantial adverse impact to the visual quality and character of the lagoon.	CEQA and NEPA: Construction activities would result in a direct temporary and cumulative significant and substantial adverse change in the visual quality and character of the lagoon.	CEQA: Less than significant NEPA: Not substantially adverse	No impact	*Required for Alternative 2A and Alternative 1B.* Visual-1: Temporary screening would be placed around construction areas that are secured with a chain-link fence (such as booster pumps, staging areas, etc., as shown in Figure 2-15) to provide visual screening of the equipment located within the secured area. Screening could be brown or green mesh or other similar screening material attached to the fencing that would visually hide or obscure the interior of the fenced areas. The screening would extend as high as the chain-link fence, which would range from approximately 6 to 10 feet, depending on the area being secured.	CEQA: Significant and unavoidable
	CEQA and NEPA: CBFs would introduce a built linear feature and the contrast would be strong for some beach users. Although efforts would be made to soften the appearance via naturalized finish and partial to full burial of the feature, the contrast would remain substantial. Impacts would be significant and substantially adverse.	No impact	No impact	No impact	*Alternative 2A only.* No feasible mitigation measures available.	CEQA: Significant and unavoidable
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	No impact	None required	N/A
Traffic and Circulation						
Lagoon Restoration	CEQA and NEPA: Bridge replacement construction activities would result in a substantially adverse and significant temporary direct and cumulative traffic impact due to capacity reductions causing traffic operations to degrade from LOS A to LOS F on a segment of Coast Highway	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant temporary direct and cumulative traffic impact due to capacity reductions causing traffic operations to degrade from LOS A to LOS F on a segment of Coast Highway 101, south of Chesterfield	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant temporary direct and cumulative traffic impact due to capacity reductions causing traffic operations to degrade from LOS A to LOS F on a segment of Coast Highway 101, south of Chesterfield	No impact	*Required for Alternative 2A, Alternative 1B, and Alternative 1A.* Traffic-1: Prepare work zone traffic control plans for lane closures and related construction along Coast Highway 101. The work zone traffic control plans shall be prepared in accordance with the California Manual of Uniform Traffic Control Devices (CAMUTCD), Caltrans Standard Plans (2010), and current standards and best practices of the reviewing and approving agencies. These plans are intended to accommodate workers within the roadway, while facilitating continued circulation for road users (motorists, bicyclists, and pedestrians including persons with disabilities in accordance with the ADA) through the work zone. Traffic-2: Provide advanced notification to motorists that delays and traffic congestion will occur during bridge construction and retrofitting activities to encourage avoidance of the construction area. This notification may be accomplished through various measures such as information and detour routes included on the project website; traffic details included in all notifications sent to local residents; traffic and	CEQA: Significant and unavoidable

	Alternative 2A	Alternative 1B	Alternative 1A	No Action/No Project Alternative	Mitigation Measure	CEQA Level of Significance after Mitigation
	101, south of Chesterfield Drive.	Drive.	Drive.		alternative route information published in local media; and physical traffic control measures, such as temporary signage located at various distances from the construction area.	
	CEQA and NEPA: Bridge replacement construction activities would result in a substantially adverse and significant direct and cumulative traffic impact due to reduction in capacity and the subsequent redistribution of northbound traffic to I-5 via Lomas Santa Fe Drive, causing traffic operations to degrade from LOS E to LOS F on a segment of Lomas Santa Fe Drive from Solana Hills Drive to I-5.	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant direct and cumulative traffic impact due to reduction in capacity and the subsequent redistribution of northbound traffic to I-5 via Lomas Santa Fe Drive, causing traffic operations to degrade from LOS E to LOS F on a segment of Lomas Santa Fe Drive from Solana Hills Drive to I-5.	CEQA and NEPA: Bridge retrofitting activities would result in a substantially adverse and significant direct and cumulative traffic impact due to reduction in capacity and the subsequent redistribution of northbound traffic to I-5 via Lomas Santa Fe Drive, causing traffic operations to degrade from LOS E to LOS F on a segment of Lomas Santa Fe Drive from Solana Hills Drive to I-5.	No impact	See Traffic-1 and Traffic-2.	CEQA: Significant and unavoidable
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	No impact	None required	N/A
Air Quality						
Lagoon Restoration	CEQA: Construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds and result in a significant direct and cumulative impact. NEPA: Not substantially adverse	CEQA: Construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds and result in a significant direct and cumulative impact. NEPA: Not substantially adverse	CEQA: Construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds and result in a significant direct and cumulative impact. NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Required (CEQA) for Alternative 2A, Alternative 1B, and Alternative 1A.* AQ-1: Off-road construction diesel engines not registered under ARB's Statewide Portable Equipment Registration Program that have a rating of 50 horsepower (hp) or more, shall meet, at a minimum, the Tier 3 California Emissions Standards, unless such an engine is not available for a particular item of equipment. Tier 2 engines will be allowed on a case-by-case basis when the Contractor has documented that no Tier 3 equipment or emissions equivalent retrofit equipment is available for a particular equipment type that must be used to complete construction. Documentation shall consist of signed written statements from at least two construction equipment rental firms. AQ-2: Harbor craft with a Category 1 or 2 marine engine, such as tugboats used for materials disposal, shall meet, at a minimum, EPA Tier 2 marine engine emission standards. AQ-3: Dredging equipment shall be electric, if determined by the contractor to be feasible, based on availability and cost. AQ-4: Contractors shall use alternative fueled (e.g., compressed natural gas [CNG], liquefied natural gas [LNG], propane), or electric-powered construction equipment where, if determined by the contractor to be feasible, based on availability and cost. AQ-5: The following measures shall be implemented by the construction contractor to reduce fugitive dust emissions associated with off-road equipment and heavy-duty vehicles: • Exposed surfaces (e.g., unpaved access roads) shall be watered, as necessary, to control fugitive dust. • Sweepers and water trucks shall be used to control dust and debris at public street access points. • Dirt storage piles shall be stabilized by chemical binders, tarps, fencing, or other suppression measures. • Provide sufficient perimeter erosion control to prevent washout of silty material onto public roads. • Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling. • Enforce a 15-mph speed limit on unpaved surfaces.	CEQA: Significant and unavoidable
	CEQA: NO_X emissions associated with ongoing operational maintenance activities would exceed the applicable mass emission threshold and result in a significant direct and cumulative impact. NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Alternative 2A only (CEQA).* See AQ-1 through AQ-5	CEQA: Significant and unavoidable
Materials Disposal	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	N/A	N/A
Noise						
Lagoon Restoration	CEQA: Noise impacts associated with nighttime dredging would be significant. NEPA: Not substantially adverse	CEQA: Noise impacts associated with nighttime dredging would be significant. NEPA: Not substantially adverse	CEQA: Noise impacts associated with nighttime dredging would be significant. NEPA: Not substantially adverse	No impact	No feasible mitigation measures available.	CEQA: Significant and unavoidable

	Alternative 2A	Alternative 1B	Alternative 1A	No Action/No Project Alternative	Mitigation Measure	CEQA Level of Significance after Mitigation
Materials Disposal	CEQA: Noise impacts associated with nighttime material placement would be significant. NEPA: Not substantially adverse	CEQA: Noise impacts associated with nighttime material placement would be significant NEPA: Not substantially adverse	CEQA: Noise impacts associated with nighttime material placement would be significant NEPA: Not substantially adverse	No impact	No feasible mitigation measures available.	CEQA: Significant and unavoidable
Socioeconomics and Environmental Justice						
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	No impact	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	No impact	None required	N/A
Public Services and Utilities						
Lagoon Restoration	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	No impact	None required	N/A
Materials Disposal	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	No impact	None required	N/A
Hazardous Materials and Public Safety						
Lagoon Restoration	CEQA and NEPA: The new inlet and associated CBFs would be a permanent project feature onshore and nearshore along Cardiff State Beach and persons who stray too close to these areas may result in injury should they be thrown against the CBFs or swept into the inlet or rip current. Impacts would be significant and substantially adverse.	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Required for Alternative 2A only* HAZ-1: The project applicant shall continue coordination with California Department of Parks and Recreation to relocate the mobile lifeguard tower (State Lifeguard Tower No. 6) closer to the new inlet location. HAZ-2: The project applicant shall install signs at the new inlet to enhance public awareness to avoid potential safety hazards associated with the new inlet location and associated CBFs.	CEQA: Less than significant
Materials Disposal	CEQA: Unforeseen wastes and hazardous materials could be dredged from the lagoon and create a public health hazard from management or disposal and result in a significant impact. NEPA: Not substantially adverse	CEQA: Unforeseen wastes and hazardous materials could be dredged from the lagoon and create a public health hazard from management or disposal and result in a significant impact. NEPA: Not substantially adverse	CEQA: Unforeseen wastes and hazardous materials could be dredged from the lagoon and create a public health hazard from management or disposal and result in a significant impact. NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Required (CEQA) for Alternative 2A, Alternative 1B, and Alternative 1A.* HAZ-3: A sediment management plan will be developed and implemented to test dredged materials for proper placement in the overdredge pit or for off-site transport and proper disposal and to be in compliance with local, state, and federal regulations. The plan shall specify that if unknown contamination or other buried hazards are encountered during dredging, procedures must be carried out according to applicable regulations. Any material encountered that appears to contain contaminants will be handled in accordance with local, state, and federal guidelines, and permit conditions.	CEQA: Less than significant
Global Climate Change and Greenhouse Gas Emissions						
Lagoon Restoration	CEQA: Construction-related and operational GHGs would exceed the recommended level of significance and result in a significant and adverse cumulative impact. NEPA: Not substantially adverse	CEQA: Construction-related GHG emissions would exceed the recommended level of significance and result in a significant and adverse cumulative impact. NEPA: Not substantially adverse	CEQA: Construction-related GHG emissions would exceed the recommended level of significance and result in a significant and adverse cumulative impact. NEPA: Not substantially adverse	CEQA: Less than significant NEPA: Not substantially adverse	*Required (CEQA) for Alternative 2A, Alternative 1B, and Alternative 1A.* GHG-1: On-site material hauling shall be performed with trucks equipped with on-road engines to the extent practicable. GHG-2: Limit deliveries of materials and equipment to the site to off-peak traffic congestion hours to the extent practicable. GHG-3: Restrict material hauling on public roadways to off-peak traffic congestion hours to the extent possible. During construction scheduling and execution minimize, to the extent possible, uses of public roadways that would increase traffic congestion. GHG-4: Use high-efficiency lighting and Energy Star-compliant heating and cooling units. Implement procedures for turning off computers, lights, air conditioners, heaters, and other equipment each day at close of business.	CEQA: Significant and unavoidable
Materials Disposal	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	Considered together with Lagoon Restoration	N/A	N/A

CHAPTER 1.0
INTRODUCTION

1.1 PROJECT OVERVIEW

This joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) analyzes the potential environmental consequences associated with implementation of the San Elijo Lagoon Restoration Project (SELRP or proposed project). The SELRP has two components: the restoration of San Elijo Lagoon and the disposal or reuse of materials excavated as part of that restoration. The SELRP would restore ecological functions in San Elijo Lagoon (lagoon) within the San Elijo Lagoon Ecological Reserve (Reserve). The lagoon is located in the city of Encinitas, San Diego County, California (Figure 1-1). The study area is focused on the restoration areas and is composed of approximately 960 acres, primarily within the Reserve, including the lagoon. The lagoon is separated into four areas: the east basin, central basin, west basin, and coastal area (Figure 1-2). The Reserve is owned and managed by the California Department of Fish and Wildlife (CDFW), formerly the California Department of Fish and Game (CDFG) – 348 acres; County of San Diego Department of Parks and Recreation (County DPR) – 567 acres; and the San Elijo Lagoon Conservancy (SELC) – 62 acres.

Restoration of the lagoon has the potential to generate more than 1 million cubic yards (mcy) of excess material; various options are proposed for disposal or reuse of that material (e.g., offshore ocean and/or upland disposal, offshore stockpiling for future use, placement on the beach or nearshore, reuse on-site), depending on its characteristics and suitability. On-site reuse of materials would occur for construction of transition and nesting areas. Construction of an on-site overdredge pit is also evaluated under alternatives where a large enough area would be disturbed to allow for it. An overdredge pit would provide sand for off-site reuse within the coastal area, or littoral cell, while accommodating disposal of finer-grained material on-site. A secondary study area encompasses off-site locations that have been identified for potential materials disposal or reuse (Figure 1-3).

The lagoon is a regionally important coastal wetland with substantial human and environmental resources. It provides habitat for federally listed threatened and endangered species, as well as other sensitive plants and wildlife, and offers recreation opportunities within the Reserve. Lagoon functions have become compromised over time, as development and infrastructure constraints have affected the ecosystem and the gradient of habitats within the lagoon (e.g., between unvegetated and vegetated intertidal habitats). The SELRP is an effort to restore

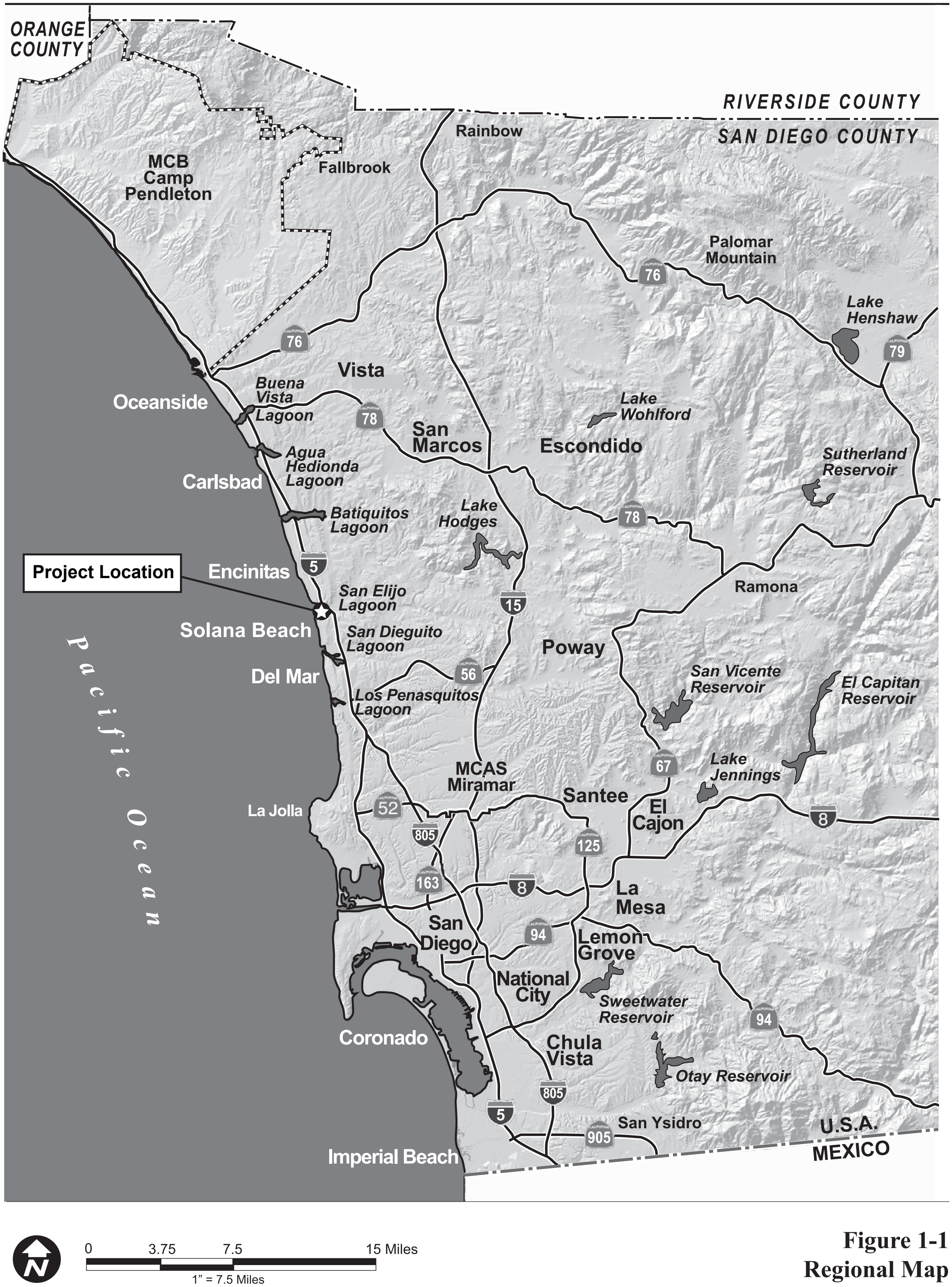
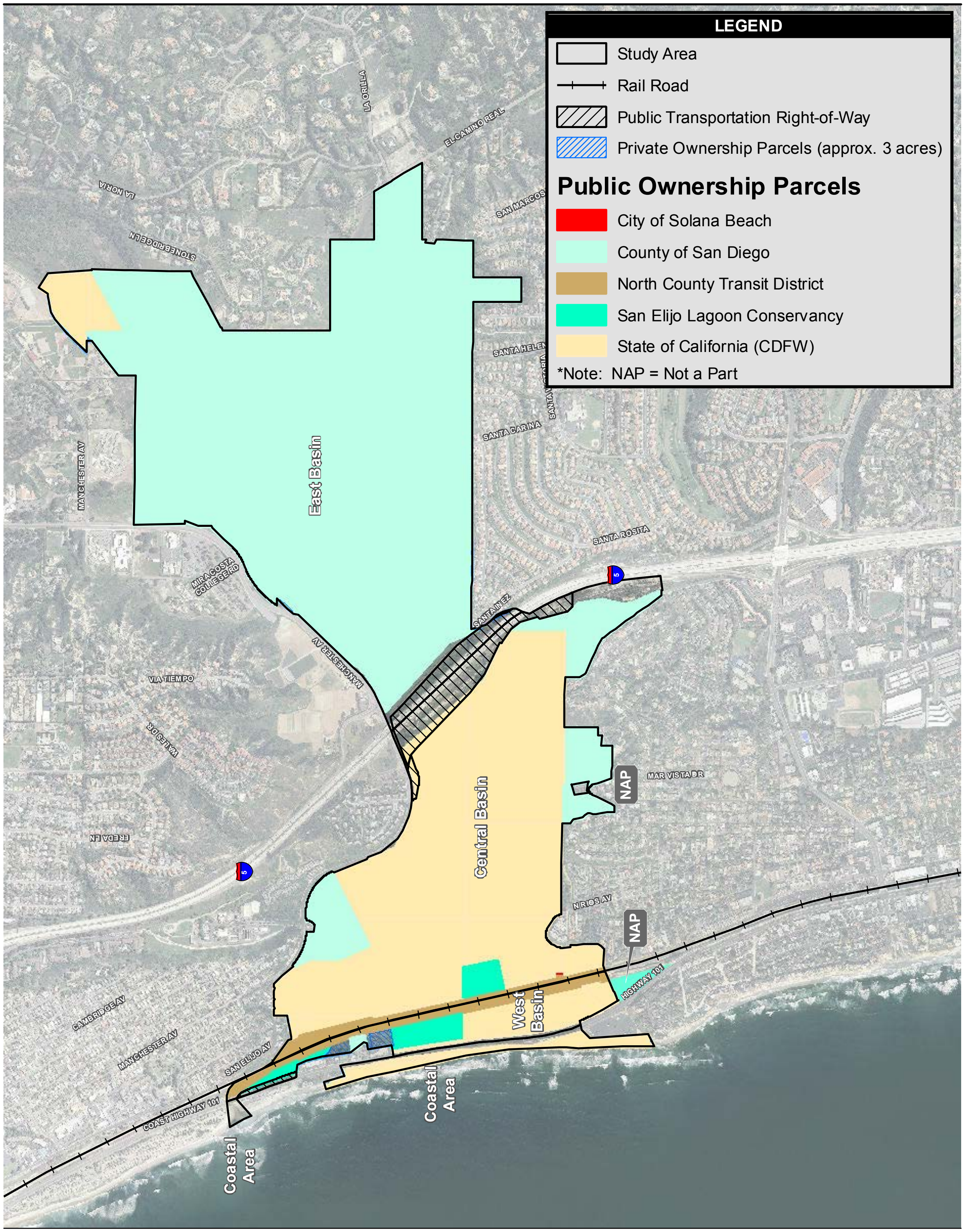


Figure 1-1
Regional Map



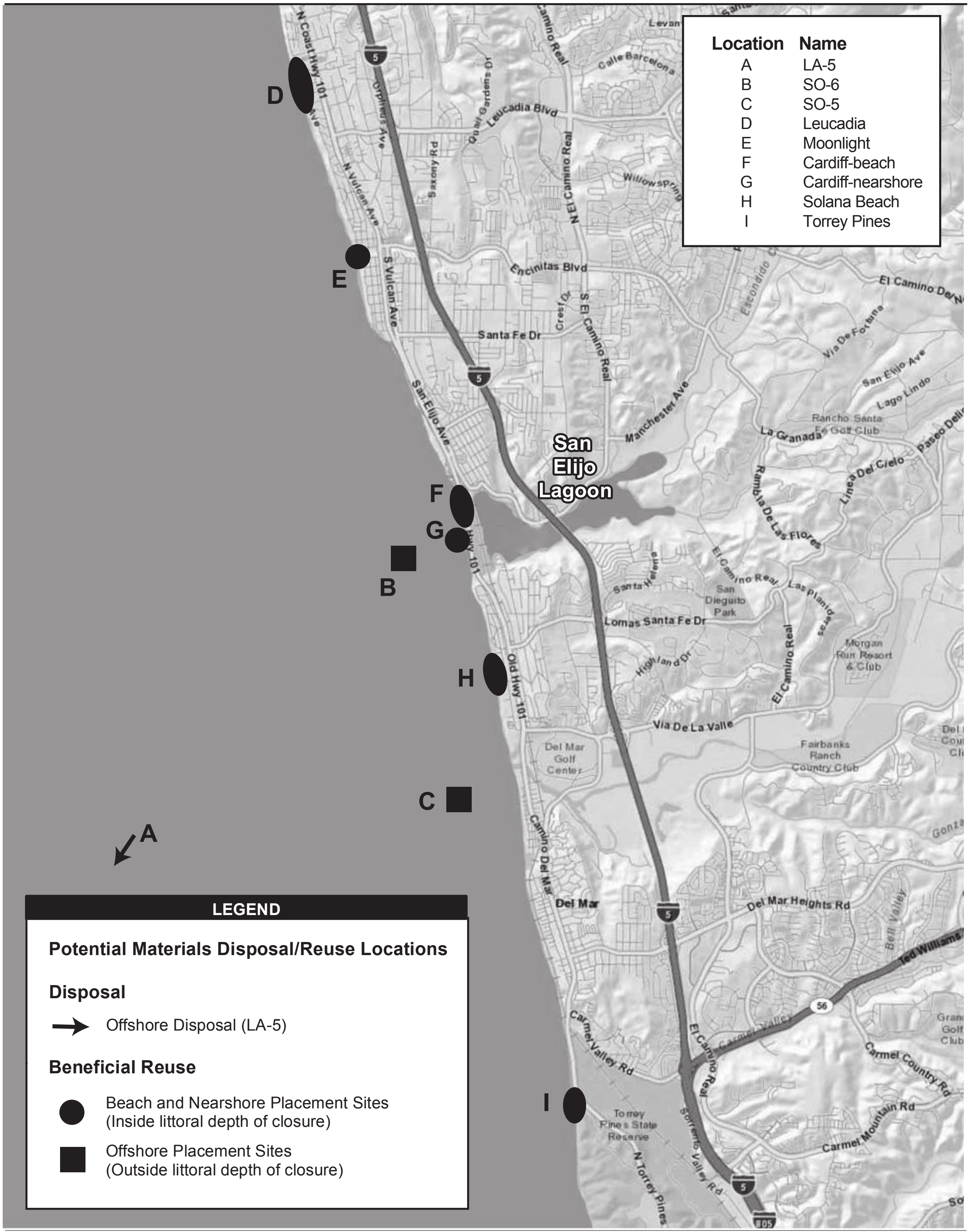
Source: Landiscor 2010; SanElijoConservancy; SanGIS; AECOM 2012

2,000 1,000 0 2,000 Feet

Scale: 1:24,000; 1 inch = 2,000 feet

Figure 1-2
San Elijo Lagoon Restoration Project
Study Area and Land Ownership

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\StudyArea_and_Ownership.mxd, 2/12/2014, steinb



Source: ESRI; SANGIS; AECOM 2012

1 0.5 0 1 Miles

Scale: 1:24,000; 1 inch = 2,000 feet

Figure 1-3
SELRP Materials Disposal/Reuse Study Areas

lagoon functions and services to the extent practicable given the current constraints of surrounding development and activities. The proposed project aims to improve water quality and enhance tidal exchange of the lagoon with the ocean by removing nutrient-rich sediments and modifying existing constraints, such as a limited channel network and infrastructure due to Coast Highway 101, the North County Transit District (NCTD) railroad, Interstate 5 (I-5), and a weir owned by CDFW. Habitat distributions proposed by the SELRP would represent a more connected gradient of balanced habitat types that would provide both nesting and foraging habitats for different bird species. Increased habitat heterogeneity would also support reptiles, amphibians, mammals, and invertebrates. The project aims to create a more resilient ecosystem that can accommodate future climate change scenarios, including sea level rise. The project incorporates periodic maintenance and monitoring, as well as an adaptive management component, to provide for maintenance of enhancements made as part of the SELRP into the future.

Restoration of the lagoon will require issuance of permits from the U.S. Army Corps of Engineers (Corps) and San Diego Regional Water Quality Control Board (RWQCB) pursuant to Sections 404 and 401 of the Clean Water Act (CWA), respectively, for the discharge of fill material into "waters of the U.S.," as well as a permit from the Corps pursuant to Section 10 of the Rivers and Harbors Act (RHA) for work in, over, or under waters of the U.S. In addition, a permit consistent with Section 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) may be required for ocean disposal, depending on the alternative chosen. The Corps is required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for potential impacts on federally endangered or threatened species, and with NMFS pursuant to the Magnuson-Stevens Act for potential impacts to Essential Fish Habitat (EFH). Accordingly, these regulatory and wildlife entities have key interests in the proposed project.

This EIR/EIS has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (Public Resources Code [PRC] Section 21000 et seq.) and the Guidelines for Implementation of CEQA published by the Resources Agency of the State of California (California Administrative Code Section 15000 et seq.). The document also meets the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [USC] Section 4321 et seq.) in conformance with the Council for Environmental Quality's (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] Part 1500 et seq.) and the Corps' NEPA Implementation Procedures (33 CFR Part 325, Appendix B).

County DPR is part owner of the Reserve and manages it in coordination with the SELC and CDFW. As owner, County DPR will issue a right of entry permit for implementation of the project on the County's land and will certify the EIR in compliance with CEQA. Upon certification, County DPR will adopt Findings and a Statement of Overriding Considerations, as necessary, and will file a Notice of Determination (NOD).

A permit application for the discharge of dredged and/or fill material into jurisdictional waters of the U.S. and work in waters of the U.S. was submitted to the Corps on August 2, 2012. It is anticipated that a long-term Department of the Army (DA) standard individual permit pursuant to Section 404 of the CWA and Section 10 of the RHA for the SELRP and adaptive monitoring and maintenance program will be issued. If offshore disposal is also required, a DA permit pursuant to Section 103 of the MPRSA will also be requested. Pursuant to NEPA, this EIR/EIS fulfills the Corps' responsibility to document a reasonable range of project alternatives, and provide full and fair discussion of anticipated environmental impacts within the Corps' NEPA scope of analysis. The Corps will also use this document in its permit evaluation process, which incorporates factors indicated in 33 CFR Section 320.4: public interest review; effects on wetlands; fish and wildlife; water quality; historic, cultural, scenic, and recreational values; consideration of private ownership; effects on coastal zones; and other federal, state, or local requirements.

A Sampling and Analysis Plan (SAP) has been prepared for the SELRP to provide a preliminary evaluation of the suitability of material underlying the lagoon for beneficial reuse within the littoral zone (e.g., beaches, nearshore, or for offshore stockpiling for future use in the littoral zone) or disposal at LA-5, a current U.S. Environmental Protection Agency (EPA)-approved ocean disposal site located off San Diego. The May 2013 report summarizing the SAP for the SELRP is included as Appendix A.

Project alternatives evaluated in this document and the analysis of environmental impacts also fulfill the Corps' responsibility to ensure compliance with the CWA Section 404(b)(1) Guidelines. The Section 404(b)(1) Guidelines state that no discharge of dredged or fill material will be permitted if there is a practicable alternative to the proposed discharge that would have a less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant environmental consequences (40 CFR Section 230.10[a]). Temporary and permanent impacts to the physical and biological attributes of the aquatic environment are evaluated by the Corps in the Draft Section 404(b)(1) Alternatives Analysis in accordance with the Section 404(b)(1) Guidelines. The Draft Section 404(b)(1) Alternatives Analysis identifies the preliminary Least Environmentally Damaging Practicable Alternative (LEDPA), and is provided in this Final EIR/EIS as Appendix O. The final Section 404(b)(1) Alternatives Analysis will be provided with the Corps' Record of Decision (ROD). The ROD will document the Corps' decision on the proposed project, including issuance, issuance with special conditions, or denial of the DA permit.

1.2 PROJECT PURPOSE AND NEED, CORPS BASIC AND OVERALL PURPOSE, AND CEQA PROJECT OBJECTIVES

Implementing regulations for NEPA published by CEQ states that the Purpose and Need section in an EIS “shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action” (40 CFR Section 1502.13). In addition to defining the purpose of the proposed project pursuant to NEPA, the Corps must evaluate the proposed discharge of dredged or fill material for its compliance with the CWA Section 404(b)(1) Guidelines (40 Part 230). A critical initial part of evaluating this compliance is identifying the basic and overall purposes of the proposed project. The basic project purpose comprises the fundamental, essential, or irreducible purpose of the proposed action and is used by the Corps to determine whether an applicant’s project is water dependent (i.e., whether it requires access or proximity to or siting within a special aquatic site). If a project is not water dependent, practicable alternatives that do not involve a discharge of dredged and/or fill into special aquatic sites are presumed available, unless clearly demonstrated otherwise. This is often referred to as the rebuttable presumptions. Section 15124[b] of the CEQA Guidelines requires that the project description contain a statement of objectives, including the underlying purpose of the proposed project.

This section of the EIR/EIS provides the Purpose and Need (NEPA and Corps 404(b)(1) and the CEQA project objectives for the proposed project. Purpose and Need are discussed separately to satisfy regulations.

Need for the Project

San Elijo Lagoon is a coastal wetland with substantial biological and ecological resources that are important to the region. It is located at the terminus of the Escondido Creek and La Orilla Creek at the Pacific Ocean. The lagoon and adjacent uplands compose the Reserve, which provides habitats that support sensitive species, including federally threatened and endangered plants and animals, and resident and migratory wildlife. As typical of coastal lagoons in southern California, San Elijo Lagoon has a relatively narrow connection to the ocean and a confluence of freshwater flows from upstream. Various transportation infrastructures that traverse the lagoon inhibit freshwater flow to the ocean and tidal flow into the lagoon. A mosaic of habitat and ecosystems occurs, from open water to dense freshwater marsh. The habitat is linked directly to tidal inundation and frequency. The species that utilize this mosaic vary by habitat. In addition, the Reserve provides recreational opportunities, including more than 7 miles of public hiking trails.

Over the past several decades, the lagoon system has gradually degraded due to the expansion of urban development within the upstream watershed. This development has altered the hydrology and, subsequently, the physical and biological functions of the lagoon system. Water quality has decreased due to nutrient accumulation in lagoon sediments, lack of circulation in the lagoon, and sedimentation in areas of impounded water. Habitats within the lagoon have been rapidly converting to a habitat mosaic with less heterogeneity and/or greater freshwater influence. Mechanical breaching of the ocean inlet is routinely performed to maintain a predominantly open inlet and tidal flushing within the lagoon. That activity has subsequently lowered overall average water levels in the lagoon, allowing unvegetated areas to become vegetated. While an open inlet allows freshwater to exit the lagoon and salt water exchange to occur more frequently, severe tidal muting[1] occurs. Muted tidal conditions, changes in inundation frequency, and increasing freshwater inputs from upstream development have resulted in the proliferation of freshwater marsh habitat dominated by cattail (*Typha* spp.) and the expansion of low- and mid-marsh at the expense of mudflat areas. If measures are not taken to improve lagoon water quality and hydrology, muted tidal exchange and restricted water circulation will continue to degrade the physical and biological functions of the lagoon. Freshwater marsh and higher elevation saltmarsh habitats will likely continue to expand and dominate the system, at the expense of more rare intertidal habitats. Water quality issues will continue to cause eutrophication and low dissolved oxygen conditions during certain periods of the year. Threatened, endangered, and sensitive plant and animal species currently dependent on the aquatic and intertidal habitats within the lagoon would be adversely affected by these conditions.

NEPA Purpose of the Project

The purpose of the project is to enhance and restore the physical and biological functions and services of San Elijo Lagoon by increasing hydraulic efficiency in the lagoon, addressing existing water quality impairments, and halting ongoing conversion of unvegetated wetland habitats to support a more connected gradient of balanced habitat types.

Overall and Basic Project Purposes (Corps' Section 404(b)(1))

The basic project purpose of the SELRP is environmental restoration of a coastal lagoon; this is, by definition, a water-dependent activity. Although special aquatic sites would be impacted by the proposed project, because the activity is water dependent, the applicant does not need to rebut the presumption that a practicable alternative exists that does not involve discharge into a special aquatic site. However, the applicant must rebut the presumption that there is not a

[1] Tidal muting refers to a tide range that is lower in one area (e.g., wetland) than an adjacent tidal water body (e.g., ocean) due to structures or other hydrologic characteristics that inhibit the exchange of water between the two.

LEDPA.The overall project purpose serves as the basis for the Corps' Section 404(b)(1) Alternatives Analysis and is determined by further defining the basic project purpose in a manner that more specifically describes the applicant's goals for the project. The overall project purpose allows for a reasonable range of alternatives to be analyzed. For this proposed project, the NEPA purpose is also the Corps' overall project purpose.

CEQA Goals and Objectives

The overarching goal, or purpose, of the proposed project is to protect and restore, then maintain via adaptive management, the San Elijo Lagoon ecosystem and its adjacent uplands to perpetuate native flora and fauna characteristics of southern California, and restore and maintain estuarine and brackish marsh hydrology. This goal can be further refined into four categories of objectives:

1. Physical restoration of lagoon estuarine hydrologic functions
2. Biological restoration of habitat and species within the lagoon
3. Management and maintenance to ensure long-term viability of the restoration efforts
4. Maintenance of recreational and educational opportunities

These four categories of objectives are further defined below.

1. Physical Objectives

A. Open the lagoon mouth regularly, or create a permanently open mouth, to maximize the overall functions and services of the lagoon in light of existing and future constraints.

B. Expand the acreage of tidal habitats by enlarging the tidal prism, grading appropriate elevations and contours to support a diversity of desired tidal habitats, and managing freshwater inputs.

C. Improve water quality by removing high-nutrient sediments, restoring tidal circulation, and reducing high bacteria counts and the potential for mosquito-borne disease.

D. Ensure that no adverse change to current flood protection occurs as a result of the project, specifically to existing or proposed infrastructure and adjacent development.

E. Minimize the disturbance of cultural resources.

2. Biological Objectives

A. Provide a natural gradient of habitats that considers climate change, anticipated sea level rise, heterogeneity of habitats, and tidal channels of various orders.

B. Enhance habitats for native species, including rare and federally listed and state-listed threatened and endangered species, to maintain species diversity that is appropriate to habitat distribution and regional needs.

C. Provide long-term protection of the functions and services of the Reserve from adjacent recreational and other anthropogenic land uses.

3. Management and Maintenance Objectives

A. Develop a cost-effective management and maintenance plan for supporting the proposed habitat enhancements, curtailing growth and expansion of exotic species, and maintaining regular tidal flow.

B. Design and implement a biological and hydrological monitoring program to assess the success of restoration efforts and to inform adaptive management decisions.

4. Recreational Access and Education Objectives

A. Minimize impacts to recreational opportunities.

B. Maintain public access to the lagoon and educational opportunities that are consistent with resource protection needs and requirements.

1.3 LEAD, RESPONSIBLE, AND TRUSTEE AGENCIES

Because of federal and local discretionary actions, the proposed project requires evaluation pursuant to both NEPA and CEQA. Under CEQA, a lead agency is any public agency that is principally responsible for carrying out or approving a project. County DPR is the lead agency responsible for compliance with CEQA. Under NEPA, a lead agency is the agency preparing or having taken primary responsibility for the preparation of an EIS. The Corps is the federal lead agency responsible for compliance with NEPA. Given the proposed project's complexity and range of potentially significant issues, an EIR is being prepared. An EIS is required under NEPA because preliminary assessment of the project identified significant impacts to resources, including air quality and biological resources. The Corps and County DPR have agreed to jointly prepare this EIR/EIS to address the federal, state, and local requirements for environmental analysis and permitting.

Several other agencies have special roles with respect to the proposed project and may use this EIR/EIS as the basis for their decisions to issue approvals and/or permits that might be required. Section 15381 of the CEQA Guidelines defines a responsible agency as follows:

> … a public agency which proposes to carry out or approve a project, for which a lead agency is preparing or has prepared an EIR or negative declaration. For the purposes of CEQA, the term ‘responsible agency’ includes all public agencies other than the lead agency which have discretionary approval power over the project.

Additionally, Section 15386 of the CEQA Guidelines defines a trustee agency as follows:

> … a state agency having jurisdiction by law over natural resources affected by a project which are held in trust for the people of the state of California.

Responsible and trustee federal, state, and local agencies that may rely on this EIR/EIS in a review capacity or as a basis for issuance of a permit for the proposed project include the following:

- U.S. Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- Environmental Protection Agency (EPA)
- U.S. Coast Guard (USCG)
- California Coastal Commission (CCC)
- California Department of Fish and Wildlife (CDFW)
- California Regional Water Quality Control Board (RWQCB)
- California Department of Transportation (Caltrans)
- California Department of Conservation (DOC)
- California Department of Boating and Waterways (DBW)
- California State Parks
- State Lands Commission (SLC)
- State Water Resources Control Board (SWRCB)
- State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO)
- State Mining and Geology Board (SMGB)
- San Diego Association of Governments (SANDAG)
- North County Transit District (NCTD)
- San Diego Air Pollution Control District (SDAPCD)
- City of Encinitas
- City of Solana Beach

1.4 SCOPING PROCESS, PUBLIC INVOLVEMENT, AND ISSUES

Throughout the environmental process and during the preparation of this EIR/EIS, County DPR and the Corps have solicited input on key issues and concerns from public agencies, stakeholder and interest groups, and the general public. The public scoping process was designed to help determine the range of issues addressed in the EIR/EIS. Additional stakeholder meetings assisted in defining concerns about the proposed project. The different aspects of public scoping discussed in this section include the Notice of Preparation (NOP) consistent with CEQA and Notice of Intent (NOI) consistent with NEPA, public scoping meetings, and stakeholder coordination. Early and open consultation with relevant agencies, organizations, and individuals assisted in defining the scope of this EIR/EIS.

Notice of Preparation and Notice of Intent

The County DPR and the Corps initiated the scoping process on November 3, 2011, through the circulation of an NOP and NOI. The NOP was received by the State at the California Office of Planning and Research (OPR) on November 4, 2011. The Clearinghouse is responsible for monitoring compliance of state agencies. The Clearinghouse assigned state identification number SCH #2011111013 to this EIR/EIS. The NOI was received by the Office of the Federal Registrar (OFR) National Archives and Records Administration (NARA) on November 3, 2011, and was published in the Federal Register, Vol. 76, No. 215 on November 7, 2011. The scoping period extended through December 18, 2011, exceeding the 30-day period requirement by law.

The NOP and NOI provide formal notification to federal, state, and local agencies involved with funding or approval of a project, and to other interested organizations and members of the public, that an EIR/EIS will be prepared. The NOP and NOI are intended to encourage interagency communication concerning a proposed project and provide sufficient background information so that agencies, organizations, and individuals can respond with specific comments and questions on the scope and content of the EIR/EIS. A copy of the NOP and the NOI are provided in Appendix B, as well as the written comments received during the public scoping period.

Public Scoping Meetings

Three public scoping meetings were held to provide additional opportunities for agency and public interaction and input. These meetings, identified in Table 1-1, were held during the public scoping period at various times and locations to encourage public input.

Table 1-1
Scoping Meeting Dates and Locations

Date	Time	Location
November 15, 2011	1 p.m.	U.S. Fish & Wildlife Service, Conference Room 1 6010 Hidden Valley Road, Suite 101 Carlsbad, CA 92011
November 29, 2011	6 p.m.	City of Encinitas Community Center 1140 Oakcrest Park Drive Encinitas, CA 92024
December 1, 2011	6 p.m.	Holiday Inn Express Meeting Room 621 South Coast Highway 101 Solana Beach, CA 92075

General verbal and specific written comments were accepted at these meetings. Additionally, written comments were accepted via email and mail throughout the scoping period.

Stakeholder Coordination

A series of stakeholder meetings were held to encourage input from regulatory agencies and interested organizations during the planning process for the proposed project. These meetings were initiated during the alternatives development and planning phase of the proposed project to ensure that relevant issues and concerns were incorporated into project design. Focused meetings continue to be held to ensure agency stakeholder coordination through the environmental review process. In addition to the lead agencies and the project applicant, project stakeholders include representatives from various agencies and organizations, including those listed in Section 1.3, above.

Comments Received during Scoping Process

Comments received during the EIR/EIS scoping period included general verbal comments from scoping meetings as well as written comments from the scoping meetings and in separate responses to the NOP and/or NOI. Numerous interested parties provided input on the proposed project, including federal, state, and local agencies; local stakeholder groups; and individuals. A copy of written comments submitted as part of the scoping process is included in Appendix B. The main issues raised during the scoping process are summarized by issue area in Table 1-2.

Table 1-2
Summary of Public Comments Received during the SELRP EIR/EIS Scoping Process

Public Comments by Environmental Topic or Issue Area	Section Where Addressed in EIR/EIS
Aesthetics/Visual Impacts	
For project alternatives, analyze the visual impacts and long-term implications of structures needed to implement each alternative.	Section 3.9; Section 4.3
Air Quality/Greenhouse Gas Emissions/Sea Level Rise	
Evaluate the effects of climate change and sea level rise not only within the project area, but also the impact along the shoreline and Coast Highway 101 to determine how the project will affect the Coast Highway, State Parks land, and the existing inlet.	Section 3.16; *Sea Level Rise Analysis* (M&N 2010)
Using the three sea level rise curves required to be evaluated for federal projects (refer to Corps Shoreline Project for Solana Beach and Encinitas) [currently known as the Storm Damage Reduction and Beach Nourishment Project], include a wave run-up and tsunami inundation and damage analysis for each wave energy scenario for each project alternative.	Tsunami/coastal damage is addressed in Section 3.3 and sea level rise is addressed in Section 3.16; this specific requirement is not applicable to the SELRP.
Analyze objectionable odors caused by low tides.	Section 3.11
Biological Resources	
Provide an explanation of habitat transition occurring within the lagoon over the last several decades and the impact on lagoon resources.	Section 1.2; Section 2.1; Section 3.6
Address concern about the use and introduction of invasive plants (e.g., ice plant).	Section 2.11; Section 3.6
Discuss the existing freshwater and saltwater habitat within the project area and what it will consist of after project implementation.	Section 2.1; Section 3.6
Analyze potential impacts to offshore biological resources (e.g., eel grass, reefs, marine life).	Section 3.6
Discuss the project's impact on insect life, specifically reduction of mosquitoes and flies.	Section 3.15
Discuss the regional perspective of existing amounts of estuarine and brackish marsh habitat and the ability of the project to meet regional needs for these habitat types.	Section 1.2 describes the purpose and objectives of the project.
Analyze the project's impacts and benefits in the context of the goals of Natural Community Conservation Program (NCCP) planning efforts.	Section 3.6
Explain how the project will avoid and/or minimize short-term and long-term impacts to Belding's savannah sparrow and light-footed Ridgway's rail.	Section 3.6; Section 3.6
Prepare a jurisdictional delineation and include mitigation measures to compensate for impacts to wetlands and jurisdictional waters.	Section 3.6; Appendix G
Disclose project impacts to the following California Endangered Species Act-listed species, and provide mitigation and monitoring that meet the requirements of an incidental take permit (ITP): coastal California gnatcatcher (*Polioptila californica californica*), Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), light-footed Ridgway's rail (*Rallus obsoletus levipes*), least Bell's vireo (*Vireo bellii pusillus*), California least tern (*Sterna antillarum browni*), and southwestern willow flycatcher (*Empidonax traillii extimus*).	Section 3.6
Pursuant to Section 3511 of the California Fish and Game Code, the California Endangered Species Act-listed light-footed Ridgway's rail and California least tern are also designated as State Fully Protected species. This designation prohibits "take" or possession of these species at any time; that is, there is no take authorization available from CDFW.	Section 3.6
Provide a complete assessment of flora within and adjacent to the project area following Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities, as prepared by the California Natural Resources Agency and CDFW.	Section 3.6
Provide a discussion of direct, indirect, and cumulative impacts anticipated to biological resources.	Section 3.6; Section 5.3

Public Comments by Environmental Topic or Issue Area	Section Where Addressed in EIR/EIS
Include mitigation and minimization measures for impacts to biological resources as provided by CDFW.	Section 3.6.5
Construction Methods: Grading, Dredging, and Materials Placement	
Provide a discussion of construction methods in the project description.	Section 2.10
Include a discussion of a dredging plan that provides details and requirements for ongoing dredging and maintenance activities, and analyze impacts associated with these ongoing activities.	Sections 2.4, 2.5, 2.6; Section 2.11; Chapter 3
Prepare a grading plan and include an erosion and sediment control plan and program in compliance with the latest State Construction Permit.	This requirement is discussed in Section 3.2 and Section 3.4; actual preparation of the plan occurs once the contractor has been identified.
Discuss placement of dredged materials that are considered compatible for placement on the nearby beaches, and analyze impacts of beach sand placement on the nearshore environment.	Section 2.2; Section 2.9; Chapter 3
Consider phasing construction of the project to minimize impacts related to sensitive species.	Section 2.10
Cultural Resources	
Engage in early consultation with Native American tribes to identify the potential for cultural resources to be present within the project area.	Section 3.7
Geotechnical/Seismic Hazards and Public Safety	
The existing Coast Highway 101 Bridge (San Elijo Lagoon Bridge No. 57C-210) is susceptible to collapse in a seismic event. Dredging beyond what is currently performed at the bridge increases the likelihood of structural failure. This should be analyzed for each project alternative.	Section 3.5
Consider fire dangers to surrounding structures when choosing plant life for the project.	Section 3.15
National Flood Insurance Program (NFIP) floodplain management building requirements must be adhered to if structures are built within a Regulatory Floodplain.	Section 3.2
Explain the project's impacts with respect to erosion at San Elijo State Beach campgrounds, access to Cardiff State Beach, and potential effects to public safety and aquatic resources.	Section 3.2; Section 3.3
Hydrology and Water Quality	
Prepare a hydrology study that includes an HEC-RAS analysis, modeling the upstream and downstream flood water elevations.	The RMA 2 model was used; it is discussed in Section 3.2.
Analyze project impacts related to the hydrology of the lagoon, currently identified and emergent water quality pollutants of concern, impacts on the larger watershed, and overall coastal water quality.	Section 3.2; Section 3.3
Analyze impacts to water quality from pet waste, agricultural runoff, and freeway runoff.	NA
Land Use	
Demonstrate consistency with existing local land use plans and identify inconsistencies, if any.	Section 3.1
Noise	
Analyze noise effects on surrounding land uses due to use of heavy equipment operation during project implementation.	Section 3.12
Permitting	
Adhere to encroachment permitting process for work performed in the Caltrans right-of-way.	Chapter 1
Coordinate with San Diego Gas & Electric (SDG&E) and the California Public Utilities Commission to address required permitting or permit exemptions if relocation of SDG&E facilities is needed.	Section 3.14

Public Comments by Environmental Topic or Issue Area	Section Where Addressed in EIR/EIS
Complete written notification to CDFW for determining need of Lake and Streambed Alteration Agreement.	Section 3.6
Permit required from USCG if alterations are needed to bridges in/over/on navigable waters of the U.S. (permitting process time is 9 to 12 months).	Chapter 1
Project Description and Design	
Describe the approach to determining inlet location and design for project alternatives.	Section 2.2; Section 2.4; Section 2.5; Section 2.6
Incorporate sea level rise estimates into project design.	Chapter 1; Chapter 2
Consider removing the dike in the east basin.	Chapter 2
Consider removing the settling pond in the central basin.	Section 2.4; Section 2.5; Section 2.6
Project Schedule and Implementation Coordination with Other Projects	
Describe the anticipated project schedule, duration of dredging, and maintenance activities.	Section 2.10
Describe the relationship between the project's implementation and the implementation of larger transportation projects (i.e., improvements to I-5, Coast Highway 101, and double-tracking of the Coaster).	Section 2.3
Consider the timing of the Corps' Solana Beach and Encinitas Shoreline Protection Project and analyze whether the dredged material from the lagoon could be suitable for beach placement to supplement the volumes that would otherwise be excavated from an offshore borrow site.	Section 2.2; Chapter 5
Public Services and Utilities	
Coordinate with SDG&E regarding closures, alterations, or changes to existing access roads, pads, or other supporting rights-of-way needed.	Section 3.14
Conduct engineering evaluation to identify issues and protection measures to address how the change in tidal flushing or enhancements may cause structural integrity issues to SDG&E facilities.	Section 3.14
Ensure the protection of utilities (i.e., overhead utilities lines and existing buried electronic distribution lines) during and after project construction.	Section 3.14
Maintain access to pump stations and force mains for maintenance during and after project construction.	Section 3.14
Consider impacts to the pipeline and associated appurtenances crossing the lagoon to the San Elijo Ocean Outfall from dredging and restoration activities.	Section 3.14
Consider existing SDG&E high-pressure gas lines and electric transmission lines present within the project area; consider undergrounding power lines across the central basin portion of the lagoon.	Section 3.14
Consider impacts to existing pipeline and associated appurtenances, and establishment of access road to existing pipeline for maintenance.	Section 3.14
Recreation/Community Access	
Analyze potential impacts related to surfing, fishing, boating, and surfing-related tourism; running/walking; and birding.	Section 3.1
Analyze impacts to Cardiff Reef as they relate to surfing and surf quality.	Section 3.1
Surf monitoring should be considered post-project for at least 5 years.	Section 3.1
Consider potential impacts associated with removal of the dike in the east basin and the effects of removal related to community access.	Section 3.1
Consider implementation of upland buffer (minimum 100 feet) as measured from the edge of the natural and revegetated wetland habitat within the project footprint with public access and development restrictions.	Section 3.6
Consider establishment of an access road or walking trail along existing wastewater treatment pipeline to provide better access for maintenance of the outfall infrastructure and to enhance the overall walkability of lagoon.	Chapter 2; Section 3.1
Analyze impacts to beach access and trail system access.	Section 3.1

Public Comments by Environmental Topic or Issue Area	Section Where Addressed in EIR/EIS
Consider recreational enhancements such as fishing opportunities and kayaking within the lagoon.	This issue is not addressed; these activities are specifically prohibited within the lagoon by law.
Assess impacts of the removal of the existing cement land bridge on community access.	Section 3.1
Analyze impacts to pedestrian access for each project alternative and consider the inclusion of a safe and visually attractive pedestrian walkway from the beach to Coast Highway 101.	Section 3.1
Consider the addition of trail across the central basin (north/south).	Section 3.1
Consider the elevation of trails to boardwalks to reduce impacts to wetlands, where feasible.	This issue is discussed in Section 3.1; new trail segments would be elevated.
Evaluate the project's compatibility with CDFW's Marine Protected Areas.	Section 3.1
Suggested Project Alternatives	
Discuss the range of reasonable alternatives, including the No Project/No Federal Action Alternative.	Section 2.3 Chapter 4
Consider a project alternative, such as Alternative 1A, but also with these additional options in the central basin and one in the east basin: • use the existing tidal inlet • create a north-south-trending tidal channel in the west basin • enlarge the channel linking the central basin and east basin beneath I-5 • enhance existing tidal channels in the east basin • enhance existing tidal channels in the central basin • restore nonvegetated tidal mudflat habitat in the central portion of the central basin by removal of vegetation and reduction of substrate elevation to that necessary to maintain a nonvegetated intertidal state • enhance drainage and management capabilities in the east basin by replacing and adding additional flood gate valves and culverts to the existing dike.	Chapter 2
Transportation	
Discuss the need for road improvements to off-set increased traffic volumes and discuss the on- and/or off-site impacts to sensitive species or habitats as a result of necessary road improvements.	Section 3.10
Include a description of access routes to construction and staging areas.	Section 2.10
Consider traffic management during construction.	Section 3.10
Include double-tracking of the Coaster concurrently with the project.	Chapter 1; Section 5.2
Other Issues	
If an offshore mitigation reef is determined to be a necessary project component, placement of this reef is suggested in an area offshore and down the coast of the lagoon.	NA
Describe lead agencies' roles and responsibilities.	Section 1.3
Add USCG as a cooperating agency under NEPA and include in scoping correspondence.	Section 1.3

Areas of known controversy include maintaining and/or enhancing overall biological health of the lagoon, loss of existing habitat, addressing circulation and water quality concerns, beach and trail access changes, and potential impacts of materials placement to nearshore biological resources.

1.5 REGULATORY OVERVIEW, COMPLIANCE WITH APPLICABLE STATUTES, AND PERMIT REQUIREMENTS

One of the objectives of the CEQA/NEPA process is to ensure that a proposed project and its alternatives are consistent with relevant regulations, policies, and plans. Various approvals and permits would be necessary for implementation of the proposed project. Table 1-3 lists the applicable statutes and permit or approval requirements. Those policies and regulations that require specific actions, permits, or consultation by the lead agencies or project proponent are further discussed following the table and describe the process needed to meet requirements.

Full descriptions of regulatory laws, statutes, policies, and plans and the issue area to which they are applicable are included in Appendix C. The specific analysis of how each regulation, policy, or plan applies to the proposed project and its alternatives is included in each appropriate individual resource discussion in Chapter 3.

Table 1-3
Federal, State, and Local Project Approvals and Permits Required

Agency	Permit/Approval
Federal	
U.S. Army Corps of Engineers (Corps)	• DA Permit under Section 404 of the Clean Water Act, 33 United States Code (USC) Section 1344 • DA Permit under Section 10 of the Rivers and Harbors Act of 1899, 33 USC Section 403 • DA Permit under Section 103 of the Marine Protection, Research, and Sanctuaries Act, 33 USC Section 1413 (Alternative 1A only) • Issue Record of Decision • Coordination under the Fish and Wildlife Coordination Act, 16 USC Sections 661–666
National Marine Fisheries Service	• Consultation with the Corps pursuant to Magnuson-Stevens Fishery Conservation and Management Act, as amended 1996 (Public Law 104-267); • Consultation with the Corps under Section 7 of the Endangered Species Act, 16 USC Sections 1531–1544, and issuance of a Biological Opinion (BO) lead agency
State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO)	• Consultation with the Corps under Section 106 of the National Historic Preservation Act of 1966(36 Code of Federal Regulations [CFR] Part 800)
United States Coast Guard/Department of Transportation	• Navigation Permit pursuant to 33 CFR 66
U.S. Fish and Wildlife Service	• Consultation with the Corps under Section 7 of the Endangered Species Act, 16 USC Sections 1531–1544, and issuance of a BO lead agency
Federal Emergency Management Agency	• Approval of Conditional Letter of Map Revision and Letter of Map Revision

Agency	Permit/Approval
State	
California Coastal Commission	• Coastal Development Permit • Consistency Certification, Section 30600(a) of the California Coastal Act, or Waiver of Federal Consistency Provisions
California Department of Fish and Wildlife	• Streambed Alteration Agreement, Section 1601 of the California Fish and Game Code • California Endangered Species Act Section 2081 Incidental Take Permit
California State Parks	• Use Permit(s) for construction activities
California Department of Transportation District 11	• Encroachment Permit for access to Interstate 5 • Approval of plans and construction of Coast Highway 101 improvements
Regional Water Quality Control Board	• Water Quality Certification under Section 401 of the Clean Water Act
State Lands Commission	• Lease for access
State Mining and Geology Board	• Surface Mining and Reclamation Action exemption
Regional/Local	
San Diego Air Pollution Control District	• Authority to Construct/Permit to Operate
Director of Parks and Recreation	• Certify Environmental Impact Report • File Notice of Determination • Issue Right of Entry
Director of Public Works	• NPDES MS4 Permit for Priority Development Project
City of Encinitas	• Encroachment and grading permits • Storm water permits • Approval of Coast Highway 101 bridge plans and/or implementation of Coast Highway 101 retrofit • Local Coastal Plan (LCP) coastal development permit • Noise variance or exemption letter
City of Solana Beach	• Encroachment and grading permits • Storm water permits • LCP development permit • Noise variance or exemption letter
North County Transit District	• Encroachment permit for access to railroad right-of-way

California Endangered Species Act (CESA)

CESA (Fish and Game Code Section 2050 et seq.) prohibits the "take" (defined as "to hunt, pursue, catch, capture, or kill") of state-listed species except as otherwise provided in state law. CESA, administered by CDFW, is similar to the federal ESA, although unlike the federal law, CESA applies incidental take prohibitions to species currently petitioned for state-listing status (i.e., candidate species). State lead agencies are required to consult with CDFW to ensure that their authorized actions are not likely to jeopardize the continued existence of any state-listed species or result in the degradation of occupied habitat.

Under Section 2081, CDFW authorizes "take" of state-listed endangered, threatened, or candidate species through incidental take permits or memoranda of understanding if (1) the take is incidental to otherwise lawful activities, (2) impacts of the take are minimized and fully mitigated, (3) the permit is consistent with regulations adopted in accordance with any recovery plan for the species in questions, and (4) the applicant ensures suitable funding to implement the measures required by CDFW.

Regulatory Action: Prior to implementation of the SELRP, the SELC would be required to initiate formal consultation with CDFW in accordance with Section 2081 to obtain an Incidental Take Permit, if required.

California Environmental Quality Act

CEQA is a California statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a “project.” A project is an activity undertaken by a public agency or a private activity that must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency that may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment. The environmental review required imposes both procedural and substantive requirements. At a minimum, an initial review of the project and its environmental effects must be conducted. Depending on the potential effects, a further, and more substantial, review may be conducted in the form of an EIR. A project may not be approved as submitted if feasible alternatives or mitigation measures are able to substantially lessen the significant environmental effects of the project.

Regulatory Action: This EIR documents the County DPR’s compliance with the requirements of CEQA for the SELRP. The County DPR is the lead agency responsible for certifying the Final EIR and filing the NOD. The County DPR will make a decision whether to issue a right of entry permit for project implementation, and through that discretionary action certify the document. Certification will also include issuance of Findings and a Statement of Overriding Considerations, as required, as well as filing of the NOD. The certification of the EIR by the County DPR would occur prior the issuance of a ROD by the Corps.

California Coastal Act

The CCC was established in 1972 by voter initiative via Proposition 20. The California Coastal Act of 1976 tasked the agency with protection of coastal resources. The state authority controls construction along the state’s 1,100 miles of shoreline through the issuance of Coastal Development Permits (CDPs). The CCC assists local governments in implementing local coastal planning and regulatory powers. Under the Act, local governments are encouraged to adopt Local Coastal Plans (LCPs) within their jurisdictions. The LCP consists of a Land Use Plan (LUP) with goals and regulatory policies as well as a set of Implementing Ordinances. Even with an approved LCP, the state CCC occasionally retains jurisdiction over some lands and continues to issue permits in those “retained jurisdictional” areas. The cities of Encinitas, Solana Beach, and San Diego have approved LCPs that address potential materials placement sites. Relevant policies specific to each LCP are discussed below under each jurisdiction. San Elijo Lagoon is located within retained jurisdiction and is not addressed by a local LCP.

Several sections of the California Coastal Act focus on shoreline construction, specifically Sections 30235, 30233, and 30706. All of these sections contain an element pertaining to the protection of existing structures and the protection of public beaches in danger of erosion. Under these sections, construction will be allowed through revetments, breakwaters, groins, or other means that alter natural shoreline processes; dredging of open coastal waters, lakes, wetlands, and other areas will be permitted only where less feasible environmentally damaging alternatives are not available. In particular, in Section 30233, dredging and spoils disposal, planned to avoid significant disruption to marine and wildlife habitats and water circulation, is allowed for restoration purposes. Section 30233 states further that dredge spoils suitable for beach replenishment should be transported to appropriate beaches or into suitable longshore current systems.

Regulatory Action: Prior to implementation of the SELRP, but after certification of the EIR component of this document by the County, the CCC would determine whether to approve a CDP for both the lagoon restoration and materials disposal component of the project, as applicable. It is anticipated the CCC would approve a consolidated CDP addressing the project as a whole; it is possible that the project could obtain a permit from the CCC for work within the lagoon, and individual permits from the cities of Encinitas and Solana Beach for potential sand placement on city beaches.

<u>California Fish and Game Code</u>

Pursuant to California Code of Regulations, title 14, section 630(b)(103), the State Fish and Game Commission declared the property owned by the County and the State to be the San Elijo Lagoon Ecological Reserve.

Under Sections 1601–1603 of the Fish and Game Code, agencies are required to notify CDFW prior to implementing any project that would divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake.

Section 1602 – Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Fish and Game Code Section 1602. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW:

- substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake; or
- deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

The Fish and Game Commission defines “stream” as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. CDFW’s jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. In practice, CDFW typically extends its jurisdictional limit to the top of a stream, the bank of a lake, or outer edge of the riparian vegetation, whichever is wider. Riparian habitats do not always have identifiable hydric soils, or clear evidence of wetland hydrology as defined by the Corps. Therefore, CDFW wetland boundaries often include, but extend beyond, Corps wetland boundaries. Jurisdictional boundaries under Fish and Game Code Sections 1600–1616 (CDFW’s Lake and Streambed Alteration Program) may encompass an area that is greater than that under the jurisdiction of CWA Section 404. Therefore, jurisdictional waters of the state include jurisdictional waters of the U.S.; federal and state jurisdictions do overlap, but would remain distinct for regulatory administration and permitting purposes. A CDFW Streambed Alteration Agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

Regulatory Action: Prior to implementation of the SELRP, CDFW would determine whether to approve a Section 1602 Streambed Alteration Agreement.

<u>California State Lands Commission Public Trust Doctrine</u>

The California SLC has exclusive jurisdiction over all of California’s tide and submerged lands and the beds of naturally navigable rivers and lakes, which lands are sovereign lands, and swamp and overflow lands and State School Lands (proprietary lands). The SLC has statutory authority (Division 6 of the California Resources Code) to approve appropriate uses of state lands under its jurisdiction and is the administrator of the Public Trust Doctrine over sovereign lands.

Sovereign lands may only be used for purposes consistent with this public trust; uses include commerce, navigation, fisheries, open space, wetlands, and other related trust uses. The SLC has an oversight responsibility for tide and submerged lands legislatively granted in trust to local jurisdictions (PRC Section 6301), extending to activities within submerged lands (from mean high tide line) and those within 3 nautical miles offshore.

Regulatory Action: After certification of the EIR, but prior to implementation of the SELRP, the SLC would determine whether to issue a lease to the SELC for activities below the mean high tide line (MHTL), including dredging in the lagoon and for materials disposal/reuse of excavated materials.

Clean Water Act

The principal law that serves to protect the nation's waters is the Federal Water Pollution Control Act, which was originally enacted in 1948. This legislation, more commonly referred to as the Clean Water Act or CWA, underwent significant revision when Congress, in response to the public's growing concern of widespread water pollution, passed the Federal Water Pollution Control Act Amendments of 1972. The 1972 legislation established two fundamental, national goals: eliminate the discharge of pollutants into the nation's waters and achieve water quality that is both "fishable" and "swimmable." The 1972 amendments to the CWA also prohibited the discharge of any pollutant to "waters of the U.S." from any point source (e.g., a discharge pipe) unless the discharge was authorized by a National Pollutant Discharge Elimination System (NPDES) Permit. CWA Section 402 sets forth regulations that prohibit the discharge of pollutants into waters of the U.S. from any point source without first obtaining a NPDES Permit.

CWA Section 303 requires states to adopt water quality standards for all surface waters of the U.S. Under CWA Section 303(d), states, territories, and authorized tribes are required to develop a list of water bodies that are considered to be "impaired" from a water quality standpoint and develop action plans, referred to as Total Maximum Daily Loads (TMDLs), to improve water quality. TMDL refers to the amount of a specific pollutant that a river, stream, or lake can assimilate and still meet federal water quality standards as provided in the CWA. TMDL accounts for all sources of pollution, including point sources, nonpoint sources, and natural background sources.

Relative to water quality protection and management for the proposed project, several sections of the CWA are important and are fully described in Appendix C:

- Section 303(d) – TMDLs

- Section 401 – Water Quality Certification
- Section 402 – NPDES Program – Municipal Permit
- Section 404 – Discharge of Dredged and/or Fill Material

Regulatory Action: After consultation and issuance of agency permits, the Corps would determine whether to issue a DA permit pursuant to Section 404 of the CWA (33 USC Section 1344). The ROD would document the permitting decision by the Corps.

Regulatory Action: After certification of the EIR, but prior to implementation of the SELRP, the RWQCB would determine whether to issue a State Water Quality Certification in accordance with CWA Section 401, in connection with the Corps' DA permits for the discharge of dredged and/or fill material.

Regulatory Action: San Elijo Lagoon is 303(d) listed as impaired by eutrophication, indicator bacteria, and sedimentation/siltation. The potential sources of the impairments are point and nonpoint sources. The TMDL action plans have not been completed yet and have RWQCB estimated completion dates in 2015 for indicator bacteria and 2019 for eutrophication and sedimentation/siltation. The SELRP could improve conditions currently contributing to the impairments identified in the 303(d) list. No regulatory action is needed at this time.

Regulatory Action: After certification of the EIR, but prior to implementation of the SELRP, the Cities of Encinitas and Solana Beach would be required to comply with the Municipal NPDES Permit Order No. R9-2013-0001, and would design and implement requirements of the Hydromodification Management Plan and low-impact development best management practices (BMPs) to reduce storm water runoff from project sites by promoting infiltration and minimizing impervious areas. Each of the three alternatives has an associated increase in impervious surfaces and dry construction areas. A Compliance Plan will describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule.

Coastal Zone Management Act (CZMA)

In 1972, U.S. Congress passed the CZMA to manage the nation's coastal resources. The CZMA is administered by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration's (NOAA) Office of Ocean and Coastal Resource Management. The CZMA balances competing land and water issues in coastal zones through the National Coastal Zone Management Program. Its goal is to preserve, protect, develop, and, where possible, restore or enhance the resources of the nation's coastal zone. Federal activities within or affecting the coastal zone must, to the maximum extent practicable, be consistent with the state's coastal management program.

Regulatory Action: After certification of the EIR, the SELC would request a consistency determination from the CCC, prior to the Corps issuing the ROD.

Endangered Species Act

The federal ESA of 1973 (16 USC Sections 1531 et seq.) directs USFWS and NMFS (the Services) to identify and protect endangered and threatened species and their critical habitat, and to provide a means to conserve their ecosystems. Section 9 of the ESA makes it unlawful for a person to take a listed animal without a permit. "Take" is defined by the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (16 Section 1532(19). Through regulations, the term "harm" is interpreted to include actions that modify or degrade habitats to a degree that significantly impairs essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of the ESA directs the Services to use its existing authority to conserve threatened and endangered species and, in consultation with federal agencies, ensure that any action authorized, funded, or carried out by such agency does not jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but would be needed for its recovery. Section 7(a)(2) requires federal agencies to consult with the Services to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. In consultation for those species with critical habitat, federal actions must also ensure that activities do not adversely modify critical habitat to the point that it would no longer aid in the species' recovery.

Regulatory Action: Prior to the issuance of the ROD, the Corps would initiate and complete formal consultation with the Services in accordance with 16 USC Sections 661–666, as needed.

Federal Emergency Management Agency – Conditional Letter of Map Revision and Letter of Map Revision

Executive Order 11988 directs federal agencies to avoid, to the extent practicable and feasible, short- and long-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development wherever a practicable alternative exists. Furthermore, Executive Order 11988 requires the prevention of uneconomic, hazardous, or incompatible use of floodplains; protection and preservation of natural and beneficial floodplain values; and consistency with the standards and criteria of the National Flood Insurance Program (NFIP). The basic tools for regulating construction in potentially hazardous floodplain areas are local zoning techniques and Federal Emergency Management Agency (FEMA) floodplain mapping. The Federal Insurance Rate Map (FIRM) is the official map created and distributed by FEMA and NFIP that delineates Special Flood Hazard Areas (SFHAs)—areas that are subject to inundation by a base flood—for every county and community that participates in the NFIP.

For projects that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source, and thus would result in the modification of the existing regulatory floodway, effective Base Flood Elevations, or an SFHA, a Conditional Letter of Map Revision (CLOMR) could be necessary. A CLOMR is FEMA's comment on a proposed project that would make such hydrologic modifications. A Letter of Map Revision (LOMR) is FEMA's modification to an effective FIRM based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway.

Regulatory Action: A CLOMR and LOMR must be prepared by the City of Encinitas and approved by FEMA before beginning any project construction activities, if applicable.

<u>Magnuson-Stevens Fishery Management and Conservation Act, as amended 1996 (Public Law 104-267)</u>

Federal agencies must consult with NMFS on actions that may adversely affect EFH, which is defined as those "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." NMFS encourages streamlining the consultation process using review procedures under NEPA, Fish and Wildlife Coordination Act, CWA, and/or FESA provided that documents meet requirements for EFH assessments under Section 600.920(g). EFH assessments must include (1) a description of the proposed action, (2) an analysis of effects, including cumulative effects, (3) the federal agency's views regarding the effects of the action on EFH, and (4) proposed mitigation, if applicable.

Regulatory Action: Prior to the issuance of the ROD, the Corps would initiate and complete consultation with NMFS regarding EFH assessment, as needed.

Marine Protection, Research, and Sanctuaries Act (MPRSA)

In 1972, Congress enacted the MPRSA (also known as the Ocean Dumping Act) to prohibit the dumping of material into the ocean that would unreasonably degrade or endanger human health or the marine environment. MPRSA regulates the ocean dumping of all material beyond the territorial limit (three miles from shore) and prevents or strictly limits dumping material that "would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities." Virtually all material ocean dumped today is dredged material (sediments) removed from the bottom of waterbodies in order to maintain navigation channels and berthing areas. Other materials that are currently ocean disposed include fish wastes, human remains, and vessels. Ocean dumping cannot occur unless a permit is issued under the MPRSA. Section 103 of MPRSA authorizes the Corps to issue permits, subject to EPA approval, for transport and disposal of dredged material (i.e., material excavated from navigable U.S. waters) at designated ocean disposal sites (e.g., LA-5). For other materials, EPA is the permitting agency. EPA is also responsible for designating recommended ocean dumping sites for all types of materials. This act would only be applicable to Alternative 1A as it is the only alternative that proposes ocean disposal of dredged material.

Regulatory Action: If Alternative 1A were selected for implementation, the Corps would determine whether to issue a DA permit pursuant to Section 103 of the MPRSA.

National Environmental Policy Act, *as amended*

NEPA established a U.S. national policy promoting the enhancement of the environment and also established the President's CEQ. NEPA requires federal agencies to conduct an interdisciplinary analysis of the environmental consequences of their actions early in the decision-making process. NEPA is to ensure that environmental factors are weighted equally when compared to other factors in the decision-making process undertaken by federal agencies. CEQ regulations (40 CFR Parts 1500–1508) set the standard for NEPA compliance. They also require agencies to create their own NEPA implementing procedures. These procedures must meet the CEQ standard while reflecting each agency's unique mandate and mission. Consequently, NEPA procedures vary from agency to agency. Further procedural differences may derive from other statutory requirements and the extent to which federal agencies use NEPA analyses to satisfy other review requirements.

Regulatory Action: This EIR/EIS documents Corps compliance with the requirements of NEPA for the SELRP. The Corps is the federal lead agency responsible for conducting the NEPA process and issuing the ROD. The issuance of a ROD by the Corps would occur after consultation and issuance of agency permits.

National Historic Preservation Act (NHPA)

The NHPA, as amended (16 USC Sections 470–470w), is the fundamental law concerning the protection of cultural resources on federal land, or cultural resources that may be affected by an undertaking that requires federal financial assistance, or a federal permit, license, or approval. Under the NHPA, its amendments, and its implementing regulations, federal agencies are required to responsibly manage federally owned or controlled cultural resources. Federal agency requirements pertinent to the SELRP are addressed in Section 106 of the NHPA and its implementing regulations.

Section 106

Section 106 of the NHPA requires federal agencies to take into consideration the potential effects of their undertakings on historic properties, and is generally applicable when an undertaking is the type of activity that has the potential to affect such properties. Federal undertakings include federal projects, permits, grants, and loans. The purpose of Section 106 is to avoid unnecessary impacts to historic properties from federal undertakings. The Section 106 review process is described in the Advisory Council on Historic Preservation (ACHP) regulations (36 CFR Part 800, as amended August 5, 2004) and Corps implementing regulations at 33 CFR Part 325, Appendix C. Section 106 regulations (36 CFR Section 800.16[1]) define historic properties as any prehistoric or historic district, site, building, structure, or object included, or eligible for inclusion, in the National Register of Historic Places (NRHP) (36 CFR Section 60).

Typically, to be eligible for listing in the NRHP, a property must be at least 50 years old, or have reached 50 years old by the project completion date and retain a high level of integrity of those attributes that contribute to the property’s qualifications for the NRHP.

Section 106 and the Corps’ implementing regulations provide a systematic mechanism for taking into account the effects on NRHP-eligible resources from actions that are federally sponsored, funded, or licensed. It requires that the SHPO and Native American tribes with historic ties to the area (and possibly other parties) be afforded an opportunity to comment on the undertaking. The SHPO and Native American consultation to comply with Section 106 requirements will be conducted by the Corps.

Regulatory Action: Prior to issuance of the ROD the Corps would complete consultation with tribes and the SHPO in accordance with 33 CFR 325, Appendix C, and Section 106 requirements.

Rivers and Harbors Act, Section 10

Section 10 of the RHA, administered by the Corps, requires DA authorization for all structures (such as riprap) in or over any navigable waters of the U.S. or the accomplishment of any other work (such as dredging) affecting the course, location, condition or capacity of navigable waters of the U.S.

Regulatory Action: The Corps would determine whether to issue a permit for applicable structures and activities. The ROD would document the permitting decision by the Corps.

Surface Mining and Reclamation Act of 1975 (SMARA)

SMARA (PRC Sections 2710–2796) provides a comprehensive surface mining and reclamation policy with the regulation of surface mining operations to ensure that adverse environmental impacts are minimized and mined lands are reclaimed to a usable condition. SMARA also encourages the production, conservation, and protection of the state's mineral resources. PRC Section 2207 provides annual reporting requirements for mines in the state, under which the State Mining and Geology Board is also granted authority and obligations.

Regulatory Action: It is anticipated that the State Mining and Geology Board would issue an exemption from the requirements of SMARA under PRC Section 2714.

A number of infrastructure improvements are planned within the lagoon by other agencies. These include double-tracking the railroad tracks extending through the lagoon as part of the Los Angeles to San Diego Proposed Rail Corridor Improvements (LOSSAN) project and replacement of the I-5 bridge as part of the North Coast Corridor Project, proposed by the San Diego Association of Governments (SANDAG) and the California Department of Transportation (Caltrans), respectively. A Public Works Plan (PWP)/Transportation and Resource Enhancement Program (TREP) is being prepared by Caltrans and SANDAG to address comprehensive, system-wide improvements in this coastal corridor. As mitigation for corridor improvements, regional habitat enhancements to lagoons could be implemented as identified in the PWP/TREP, including the SELRP. The SELRP will therefore be designed to be consistent with the parameters of the North Coast Corridor Project Restoration and Mitigation Enhancement Program (REMP). Senate Bill 468 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. Consistent with Senate Bill 468 (Kehoe), I-5 and railroad bridges over the lagoon would occur concurrently with the SELRP. These bridges are not part of the lagoon restoration project and the environmental analysis for these project proposed (and constructed) by others is addressed in other documents (SCH #2002031067/SCH #2004101076).

1.6 EIR/EIS SCOPE, CONTENT, AND ORGANIZATION

EIR/EIS Scope and Content

The scope of analysis and the content for this EIR/EIS were established based on the professional judgment regarding the nature of the SELRP, Appendix G of the CEQA Guidelines, the Corps' standard NEPA practices, and comments received during the NOP/NOI review process as detailed in Section 1.4.

The CEQA scope of analysis for the EIR/EIS addresses the proposed restoration project, including materials disposal and/or reuse, and is primarily based on thresholds of significance as identified in the CEQA Guidelines, Appendix G. For some issue areas, these thresholds were modified or supplemented to accommodate project-specific conditions. Because the SELRP is water dependent and cannot be implemented outside of the Corps' geographic jurisdiction, the NEPA scope of analysis also includes the complete restoration project as proposed within this EIR/EIS. The Corps generally has not adopted the CEQA thresholds of significance and has applied additional federal requirements, as appropriate, into this EIR/EIS.

This EIR/EIS evaluates the direct, indirect, permanent, temporary, and cumulative effects of the proposed SELRP and alternatives, and proposes mitigation measures to minimize those effects, as feasible. The following issues were determined to be potentially significant and are, therefore, evaluated in Sections 3.1 through 3.16 of this EIR/EIS:

- Land Use/Recreation
- Hydrology
- Oceanography/Coastal Processes
- Water and Aquatic Sediment Quality
- Geology/Soils
- Biological Resources
- Cultural Resources
- Paleontological Resources
- Visual Resources
- Traffic, Access, and Circulation
- Air Quality
- Noise

- Socioeconomics/Environmental Justice
- Public Services and Utilities
- Hazardous Materials and Public Safety
- Global Climate Change and Greenhouse Gas Emissions

The analysis focuses on the substantial adverse or significant environmental effects and their relevance to the decision-making process for the proposed project and its alternatives. NEPA requires the federal lead agency to rely on a "scientific and analytical basis for the comparison of alternatives" (40 CFR Section 1502.16) in making its decisions. Environmental impacts, as defined by CEQA, include physical effects on the environment. In this document, the term is used synonymously with environmental effects, or impacts, under NEPA. The CEQA Guidelines (Section 15360) define the environment as follows:

> The physical conditions which exist within the areas which will be affected by a proposed project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.

This definition does not include economic impacts or social impacts, although NEPA does require an evaluation of socioeconomics and environmental justice. Therefore, these sections are included in this EIR/EIS.

EIR/EIS Organization

This EIR/EIS is organized so the reader can obtain fundamental information about the proposed project and its specific impacts. Impacts are described under each of the environmental resource areas in Sections 3.1 through 3.16. Detailed technical and additional background information is provided in the appendices. Each of the chapters in this document is briefly described in Table 1-4. Locations of CEQA required EIR components are provided in Table 1-5.

Table 1-4
Organization and Contents of EIR/EIS

EIR/EIS Chapter/Section		Content Description
ES	Executive Summary	Provides an overview of the project alternatives. Summarizes major findings and conclusions of the environmental analysis. Discusses areas of controversy and issues to be resolved.
1.0	Introduction	Provides a brief overview of the proposed project. Outlines the purpose, need, and objectives of the proposed project. Identifies the lead, responsible, and trustee agencies. Outlines the scoping process and comments received. Discusses compliance with other applicable statutes and permit requirements. Summarizes the scope, content, and organization of the document.

EIR/EIS Chapter/Section		Content Description
2.0	Description of the Proposed Project and Alternatives	Provides a detailed description of the project alternatives, including proposed materials disposal/reuse scenarios. Describes the alternatives development process and screening criteria for the selection of alternatives carried forward for detailed analysis in this EIR/EIS. Summarizes construction methods, project design features and minimization measures, and plans for future monitoring and maintenance.
3.0	Affected Environment and Environmental Consequences Introduction	Describes CEQA and NEPA baseline conditions used to determine the degree of environmental impacts for each issue area in Sections 3.1–3.16. Outlines the organization of each section.
3.1–3.16	Resource Analyses	Describes, for each environmental resource area, the affected environment/existing conditions(including the baseline conditions), the criteria for judging whether an impact is significant under CEQA, the impact assessment methodology, the environmental consequences that would result from each alternative, the applicable mitigation measures that would eliminate or reduce significant impacts as defined under CEQA and substantial adverse effects under NEPA, and mitigation monitoring requirements. Subsections for Affected Environment and Environmental Consequences in each resource discussion are consistent with NEPA terminology but correspond to Existing Conditions and Impact Analysis under CEQA.
4.0	Comparison of Alternatives	Provides a comparison of the project alternatives, summarizing the key differences between each alternative.
5.0	Cumulative Impacts	Provides an analysis of cumulative impacts under CEQA and NEPA to determine whether each alternative contributes to an incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.
6.0	Other CEQA and NEPA Considerations	Includes a discussion of significant, irreversible changes to the environment from project implementation; growth-inducing impacts; and the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity.
7.0	List of Preparers	Lists the individuals involved in preparing this EIR/EIS.
8.0	Agencies and Individuals Consulted	Lists the agencies and individuals consulted during the preparation of this EIR/EIS.
9.0	Literature Cited	Identifies the documents used in preparing this EIR/EIS.
10.0	Abbreviations	Provides the full names for acronyms and abbreviations used in this document.
Appendices (separately bound document)		Present additional background information and technical detail for several of the resource areas.

Table 1-5
Location of Required EIR Components

Required EIR Section	Location in document
Table of Contents and Index	Table of Contents Chapter 11.0, Index
Summary	Chapter ES, Executive Summary
Project Description	Chapter 2.0, Description of Project Alternatives
Environmental Setting	Section 2.1.1, Project Location and Environmental Setting; Section 2.1.2, Lagoon Overview and Wetland Characteristics; Section 2.9, Material Disposal Sections 3.X.1, Affected Environment, of each analysis topic in Chapter 3.0
Environmental Impacts	Chapter 3.0, Affected Environment and Environmental Consequences; Table ES-4, Summary of Environmental Effects
Significant Environmental Impacts	Chapter 3.0, Affected Environment and Environmental Consequences; Table ES-4, Summary of Environmental Effects
Mitigation Measures Proposed	Sections 3.X.4 of each analysis topic in Chapter 3.0; Table ES-4, Summary of Environmental Effects
Alternatives to the Proposed Project	Chapter 2.0, Description of Project Alternatives; Chapter 4.0, Comparison of Alternatives
Effects Found Not to be Significant	Section 6.4, Effects Found Not to be Significant
Significant Irreversible Environmental Changes	Section 6.1, Significant Irreversible Changes to the Environment or Irretrievable Commitments of Resources
Growth Inducing Impacts	Section 6.2, Growth Inducement
Cumulative Impacts	Chapter 5.0, Cumulative Impacts
Organizations and Persons Consulted	Chapter 8.0, Agencies and Individuals Consulted

1.7 AVAILABILITY OF THE DRAFT EIR/EIS

The Draft EIR/EIS was available at the County Department of Parks and Recreation offices located at 5500 Overland Avenue, Suite 410, San Diego, CA 92123, and online at http://www.co.san-diego.ca.us/parks/public_review.html for a 60-day public review period from August 1, 2014 through September 29, 2014.

The Draft EIR/EIS was also available at the following locations:

Cardiff-by-the-Sea Branch Library
2081 Newcastle Avenue
Cardiff-by-the-Sea, CA 92007

Solana Beach Branch Library
157 Stevens Avenue
Solana Beach, CA 92075

San Elijo Lagoon Nature Center
2710 Manchester Avenue
Cardiff-by-the-Sea, CA 92007

Comments from agencies and individuals were invited regarding the information contained in the Draft EIR/EIS. Where possible, those responding were to provide the information they felt was lacking in the Draft EIR/EIS or indicate where that information may be found. Written comments regarding the Draft EIR/EIS were directed to the following:

Ms. Megan Hamilton
County of San Diego Department of Parks and Recreation
5500 Overland Avenue, Suite 410
San Diego, CA 92123
megan.hamilton@sdcounty.ca.gov

or

Ms. Meris Bantilan-Smith
U.S. Army Corps of Engineers
Los Angeles District, Regulatory Division
Carlsbad Field Office
5900 La Place Court, Suite 100
Carlsbad, CA 92008
Meris.Bantilan-Smith@usace.army.mil

Following the 60-day period of circulation and review of the Draft EIR/EIS, written comments and responses to the comments were incorporated into this final EIR for certification. The Final EIS will be circulated again for 30 days prior to the Corps' issuance of a ROD.

CHAPTER 2.0
DESCRIPTION OF PROJECT ALTERNATIVES

2.1 PROJECT BACKGROUND

2.1.1 PROJECT LOCATION AND ENVIRONMENTAL SETTING

San Elijo Lagoon is located in the city of Encinitas, San Diego County, California (Figure 1-1). The lagoon is the terminus of Escondido Creek and La Orilla Creek at the Pacific Ocean. The lagoon study area is composed of approximately 960 acres, primarily within the Reserve, and separated into four areas: east basin, central basin, west basin, and coastal area (Figure 1-2). In addition to the lagoon study area, the geographical scope of this document also includes areas outside of the lagoon that could be used as disposal/reuse areas for materials excavated from the lagoon. These potential materials disposal/reuse areas are identified in Figure 1-3.

2.1.2 LAGOON OVERVIEW AND WETLAND CHARACTERISTICS

The lagoon is a coastal wetland with substantial biological and ecological resources. It includes habitat for sensitive, threatened, and endangered plants and animals, including resident and migratory wildlife. Recreational opportunities for the public are also provided within the Reserve, including more than 7 miles of public hiking trails.

San Elijo Lagoon is an open system, meaning that outside influences such as tides, stream flow, sediment input, weather, and development have affected the various vegetation communities and processes within the lagoon, particularly its aquatic processes. The historical ecological condition of the lagoon has varied dramatically in response to long-term wet and dry precipitation cycles and inlet management. In addition, the ecological capacity of the lagoon to maintain itself is being challenged due to encroachment by development adjacent to the lagoon and upstream within the 84.5-square-mile Escondido Creek watershed.

Habitat Distribution

Historically, the Southern California Bight contained much more coastal estuarine habitat than it does at present. Since the mid-1800s, a loss of approximately half of that habitat has occurred. While vegetated estuarine habitats have undergone the most loss in terms of absolute area, the largest proportional loss has occurred in unvegetated estuarine habitats, which have decreased by 78 percent (Stein et al. 2014).

One of the key recommendations of recent historic ecology studies is to use historic information as a foundation for framing current restoration efforts. This is not necessarily to recreate past conditions, but to preserve remnant habitats where possible and provide for flexible management processes, while taking into consideration current pressures, land use patterns, and potential future climate change (Stein et al. 2014; Beller et al. 2014). While a return to historic conditions is not the purpose of the SELRP, historic lagoon environment can provide a basis for understanding potential enhancement activities. In the 19th century, San Elijo Lagoon consisted primarily of salt flats (more than 50 percent), with a smaller proportion of open water and mudflats (Beller et al. 2014). Many of the pressures the lagoon faces today result from conditions that did not occur in the distant past. Watershed processes such as water and sediment delivery, constraints such as linear infrastructure, and past activities such as waste discharge into the lagoon substantially changed the current landscape compared to prior conditions. Overall, the total area of vegetated salt marsh has not decreased substantially. The distribution of that habitat has shifted, however, as increased freshwater volumes were impounded within the lagoon, creating mudflats and converting salt flats to salt and freshwater marsh.

Habitat distributions proposed by the SELRP are focused on providing a more connected gradient of balanced habitat types in the lagoon compared to existing conditions. Historic conditions indicate that, regionally, lagoons have shifted from a habitat distribution that favored vegetated (40 percent) and unvegetated (25 percent) estuarine over subtidal (35 percent) habitats, to a much more subtidal habitat mix, with 71 percent subtidal, 19 percent vegetated, and 10 percent unvegetated estuarine habitats (Stein et al. 2014). In San Elijo Lagoon, habitat distributions have actually shifted toward a more vegetated estuarine habitat distribution. Historically, the lagoon was composed of approximately 43 percent salt marsh and 57 percent unvegetated tidal area (salt panne and mudflats) (Beller et al. 2014). More recent data, however, show 75 percent of the wetland area now consists of vegetated marsh habitat, only 18 percent of unvegetated tidal area (e.g., salt panne and mudflats), and 7 percent of subtidal/open water. This shift to a more vegetated habitat distribution is ongoing, with vegetated marsh continuing to expand throughout the central basin. Each of the project alternatives considered by the SELRP considers both historic and current distributions, but is designed to provide a more connected gradient of those vegetated estuarine habitats integrated with unvegetated estuarine and open water habitats. Restoration of salt panne is complex, but remnant areas of historic salt panne would be maintained and unvegetated intertidal foraging opportunities provided by an increased emphasis on mudflats compared to existing conditions.

Hydrology and Water Quality

Historic evidence suggests that San Elijo Lagoon was once a perennially open system, prior to substantial man-made modifications. However, under the more developed conditions that characterize the lagoon currently, the negative effects of inlet closure have been documented (similar to many southern California lagoons and estuaries). Therefore, for the SELRP, high estuarine productivity has been identified as being dependent upon tidal influence. As stated in *The Ecology of Southern California Salt Marshes: A Community Profile*: "Because tides are so important in providing moisture for coastal salt marshes, any interruption in tidal circulation can have drastic effects on these communities.…The extent to which these embayments closed prior to changes brought about by man is difficult to determine, but local geologists seem to agree that closure of smaller lagoons was a natural phenomenon. Man's intervention has no doubt increased the tendency for closure as well as the persistence of sand bar blockage" (Zedler 1982). Based on this information, San Elijo Lagoon appears to have been a perennially open system with a thriving molluscan fauna and these functions have disappeared through repeated, prolonged inlet closure, regardless of the mechanism of closure.

Urbanization within the Escondido watershed has accelerated freshwater storm flows, generated year-round urban runoff, and increased chemical contaminant and nutrient loads within the lagoon. The ecological effects of increased runoff have been compounded by obstructions to flow to the Pacific Ocean caused by an inefficient channel system and the three major transportation corridors that traverse the lagoon: Coast Highway 101, the NCTD railroad, and I-5. In addition, a weir managed by CDFW extends across the east basin, further restricting freshwater flows from exiting the lagoon. These constraints on the hydraulic connection between the ocean and lagoon affect tidal exchange and drainage of freshwater flows. As a result of these inefficiencies and the lack of inlet maintenance in the past, water surface elevations in the lagoon are not the same as those of the ocean, and habitat distribution and quality have been adversely affected. Such factors, as well as historic waste discharge into the lagoon, have led to a consistent degradation of water quality (e.g., elevated bacteria levels) in the lagoon and adjacent to the lagoon mouth, leading to problems such as beach closures during moderate to large storm events that flush accumulated bacteria to the ocean. Water quality within the lagoon is currently identified under CWA Section 303(d) as impaired for eutrophication, indicator bacteria, and sedimentation.

Before San Elijo Lagoon was primarily managed as a perennially open system, many of its ecological functions were degraded. Prolonged mouth closure led to impoundment of freshwater and high biological oxygen demand, which resulted in mass die-offs of fish and invertebrate populations from osmotic shock and low dissolved oxygen. Prolonged submergence of salt marsh plant species led to their repeated temporary demise and promoted the establishment and spread of freshwater species. Management of the tidal inlet has increased stability in the system, which now supports a more balanced assemblage of plants and animals (although habitat conversion continues).

Restoration of tidal influence to the lagoon and enhancing freshwater fluvial flows out of the lagoon, in conjunction with removal of sediments with historically accumulated nutrients, would restore the physical (soils and hydrology) and biological (biogeochemical/water quality and habitat) functions and services that have been degraded over the years. For the estuarine environment to be highly productive, it must be continually replenished with water and nutrients from the ocean. Regular tidal action also promotes high water quality. The moderating influence of ocean waters prevents extreme fluctuations in salinity and temperature, and maintains high levels of dissolved oxygen. Generally, the amount of time that portions of wetlands are submerged or exposed due to tidal fluctuation is referred to the "inundation frequency," and results in a zonation typical of tidal wetlands. The extent of each wetland zone within a lagoon is dependent on tidal influence and the relative water elevation. The term "refugia" describes the area that is preserved (not impacted) for species to retreat to during construction or sea level rise. Each general wetland zone is described below, including typical tidal inundation frequencies associated with each habitat type:

> Subtidal: Subtidal habitats are areas that are always submerged (inundated 100 percent of the time). Subtidal areas provide permanent habitat for fish and aquatic invertebrates. Subtidal areas may be vegetated by eelgrass, a highly productive, marine flowering plant that typically supports a rich fish and invertebrate community. Subtidal areas are used for feeding and resting by a variety of water-associated birds, including waterfowl, loons, grebes, pelicans, cormorants, gulls, and terns.
>
> Intertidal Mudflats: Intertidal mudflats are the lowest in elevation of the intertidal habitats (submerged 100 to 40 percent of the time). Intertidal mudflats are gently sloping areas of soft mud inundated typically twice per day by tides. Mudflats may support mats of algal growth, providing food for mollusks, crustaceans, and burrowing worms. Mudflats are primary feeding areas for shorebirds and dabbling ducks. Fish forage on the mudflats when they are covered by the tides.
>
> Low-Saltmarsh: Vegetated saltmarsh is inundated less frequently and for shorter periods of time than mudflats (submerged 40 to 20 percent of the time). Low-saltmarsh is dominated by California cordgrass (*Spartina foliosa*). Cordgrass is found at elevations above mean sea level where it is submerged regularly during high tides. Therefore, cordgrass is submerged for long periods, which few other plant species can tolerate. Cordgrass provides critical nesting and breeding habitat for the endangered light-footed Ridgway's rail.
>
> Mid- and High-Saltmarsh: Saltmarsh occurs at elevations that are only submerged during higher tides (submerged 20 to 6, or 6 to 0 percent of the time for mid- and high-saltmarsh, respectively). These areas typically are dominated by Pacific pickleweed

(*Sarcoconia pacifica*). Pickleweed has the broadest elevational range of any southern California marsh plant and can survive in areas without tidal exposure. Pickleweed is tolerant of soils high in salinity. High-quality pickleweed marsh is critical breeding habitat for the state-listed endangered Belding's savannah sparrow.

Transitional: The transitional zone is used to describe the area, or ecotone, between the upper limit of the estuarine wetland (often bound by mid- and high-marsh) and the adjacent upland and freshwater wetland habitat. A natural transitional zone already exists on-site, generally represented by the 2-foot elevation band immediately above the existing high tide line. These areas currently include upland and freshwater wetland plant communities depending on their location on-site. Transitional areas provide refuge for lagoon-dependent wildlife during periods of extensive inundation and extreme tides. It should be noted that restoration would create "man-made transitional habitat" where fill is placed strategically in the central and east basins to facilitate refugia opportunities as sea level rises. Thus, transitional can refer to both this existing natural ecotone at the edges of the lagoon as well as the refugia opportunities resulting from strategic elevational increases.

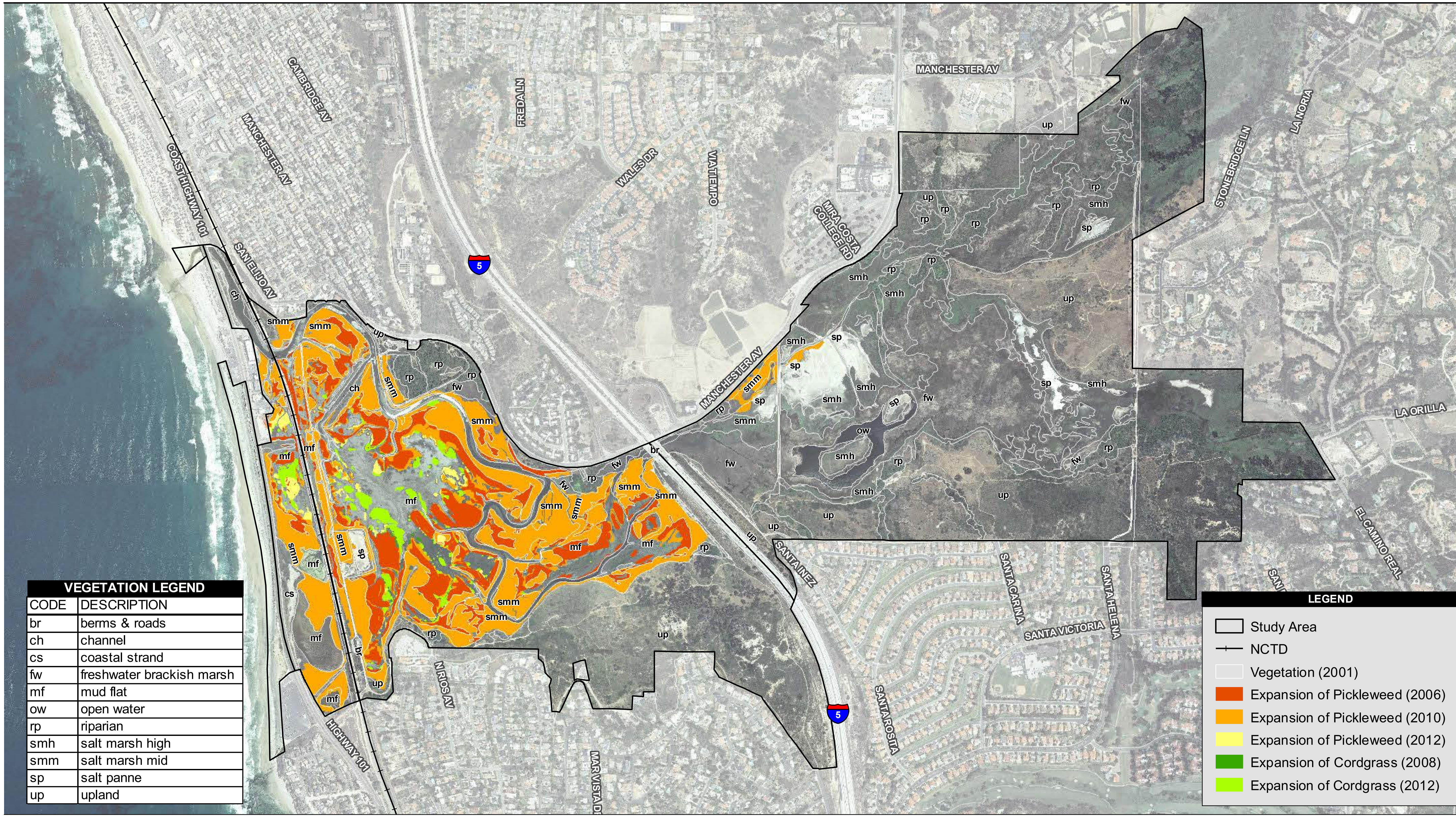
Efforts have been made since the mid-1990s to actively manage the lagoon. The San Elijo Lagoon Enhancement Plan, prepared by County DPR in 1996, identified several opportunities for enhancement and restoration, mostly by reducing sedimentation and improving tidal exchange and circulation. A long-term financial endowment was established in the late 1990s to actively fund maintenance of tidal flushing. As a result of this endowment, the SELC has actively opened the mouth of the lagoon on at least an annual basis for more than 10 years, and the lagoon mouth has remained open over 80 percent of the time over that period. Inlet management currently allows for cycles of inlet closure and opening, taking into account the pressures of existing conditions at the lagoon. The inlet is kept open most of the time but is allowed to close during the winter season. The inlet is maintained open to the extent possible during the breeding season to avoid inundating breeding bird nests and during warm months when extended eutrophic conditions are a concern. These management efforts have improved habitat and water quality relative to the stagnant conditions that previously developed when the inlet was closed for prolonged periods. Other efforts involving removal of invasive species also resulted in some improvement to habitat quality. Although important, these efforts do not remedy the underlying water quality impairments, hydraulic inefficiencies, or loss of functional mudflat within the lagoon.

Actively maintaining a lagoon mouth that is more regularly open to the ocean has resulted in a change in circulation patterns, including a decrease in relative water elevations and inundation frequencies. Habitat has been distributed throughout the lagoon at elevations and locations that are related to relic, closed-inlet conditions. Much of the functional mudflat habitat within San Elijo Lagoon is a result of higher water levels associated with historically impounded water due to a constricted hydraulic connection to the ocean. When the mouth of the lagoon is opened through active maintenance activities, the lagoon is able to drain more efficiently and areas that were historically under water the majority of the time are now exposed more frequently. These areas are becoming vegetated and ceasing to function as mudflats because they are not inundated by tides for long enough to restrict vegetation growth. Due to a change in inundation frequency, habitat within San Elijo Lagoon is rapidly converting from mudflat to low- and mid-marsh, as shown in Figure 2-1. The rapid and ongoing expansion of two key species, cordgrass and pickleweed, has been documented through focused vegetation mapping since 2001. If no action is taken to restore the lagoon's water quality and tidal regime, coupled with proper elevation for mudflats, the loss of ecologically valuable mudflat habitat would continue. Emerging salt marsh habitats are also ecologically valuable to species within the lagoon, but decreasing mudflats affect the balance of suitable foraging and nesting habitats (e.g., to the detriment of migratory and resident shorebird populations). Habitat gradients that balance both vegetated and unvegetated intertidal areas are critical to enhance and restore wetland functions and services at the lagoon level.

2.1.3 STAKEHOLDER INVOLVEMENT/COORDINATION

The SELRP brings together various public and private entities that share responsibility to protect, manage, and regulate the lagoon. The landholders are the nonprofit SELC, County DPR, and CDFW, and they work in coordination to co-manage the lagoon. Since late 2007, a group of stakeholders has met regularly to guide the development of the lagoon restoration with a holistic approach. The stakeholder group consists of representatives of the agencies/entities listed in Section 1.3. The SELRP has been largely driven by this group of stakeholders, and the project alternatives analyzed in this EIR/EIS are a result of collaborative and iterative processes to incorporate stakeholder input into project design. The stakeholder group includes not only resource and regulatory agencies, but also responsible agencies under CEQA, such as Caltrans.

Coordination has also been ongoing with various public utilities and service providers to ensure impacts to existing services and facilities are minimized. Meetings with SANDAG and Caltrans have also been held to facilitate coordination between the various proposed infrastructure improvement projects within the lagoon.



Source: SanGIS 2008; SANDAG 2012, San Elijo Lagoon Conservancy 2006; AECOM 2013

1,250 625 0 1,250 Feet

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

Figure 2-1
Existing Vegetation Communities and Habitat Conversion

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\HabitatConversion.mxd, 12/31/2013, steinb

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2.1.4 SUMMARY OF PREVIOUS RESTORATION PLANNING EFFORTS

The SELRP has evolved over a number of years and has involved many lagoon stakeholders, as described above. Consequently, a number of documents and studies have been completed that focus on various aspects related to improving the water quality, biological, and hydrologic functions of the lagoon since the mid-1990s. While each of these efforts provided valuable information to address restoration of the lagoon, when viewed collectively, they resulted in a dispersed set of planning and reference documents without a comprehensive approach to overall lagoon restoration.

In 2007, lagoon stakeholders reinvigorated efforts to develop a comprehensive approach to address restoration. The initial step was consolidation of previous studies and evaluation of available information to identify data gaps, coastal engineering and environmental studies needed, and anticipated regulatory requirements. That effort was documented in the *Final San Elijo Lagoon Restoration Project Data and Information Gap Analysis Summary Report* (Gap Analysis) (EDAW 2008).

The Gap Analysis identified the need for lagoon stakeholders to document and agree upon conceptual alternatives to be carried forward for further study. While various interested parties had devised restoration concepts and considered alternative configurations of key infrastructure, no single document was prepared to identify these concepts for further study. The *Final San Elijo Lagoon Restoration Project Alternatives Development Report* (EDAW 2009) summarizes efforts made over the last two decades to develop viable project alternatives to restore the lagoon. The Alternatives Development Report also formally documents the conceptual alternatives identified by lagoon stakeholders in late December 2008 for future study.

Since that time, the environmental and engineering studies identified as necessary have been initiated. This EIR/EIS reflects the results of those efforts. Studies completed for the SELRP include the following, in addition to technical studies included as appendices to this EIR/EIS:

- Sediment Characterization Study – Presents existing information of soils within the project area and analyzes the data for compatibility with the littoral zone. Recommends additional studies that were completed by URS in 2012 (Moffatt and Nichol [M&N], July 2010).
- Sea Level Rise Analysis – Summarizes the status of sea level projections and agency guidance to date, and recommends a design horizon for sea level at San Elijo Lagoon of 2 feet, assumed to occur in approximately 2065 (M&N, February 2010).

- Ebb Bar and Flood Shoal Study – Presents analyses of potential shoaling in the lagoon and nearshore ocean from proposed alternatives (M&N, July 2011).
- Tidal Muting Study – Presents analyses of potential tidal muting caused by shoaling for proposed alternatives, effects on tidal ranges and inundation frequency, and effects to habitat (M&N, November 2011).
- San Elijo Lagoon Bridge Optimization Study – Presents analyses of potential environmental effects of new bridge structures across San Elijo Lagoon (M&N, April 2012).
- Tidal Inlet Stability Study – Presents analyses of the stability of the tidal inlets for the proposed alternatives (M&N, July 2012).
- Shoreline Morphology Study – Presents proposed sediment beneficial re-use options, and analyses of shoreline morphology related to proposed alternatives (M&NNovember 2012).
- Revised Preliminary Draft Construction Methods Report – Presents proposed construction methods for each alternative (M&N, January 2013).

2.1.5 PROJECT SUMMARY

The proposed project and alternatives have been developed from past efforts in response to the need to improve and restore the water quality, biological, and hydrologic functions of the lagoon. Each of the alternatives evaluated within this document proposes actions that would enhance existing lagoon functions and services through dredging and grading activities. The range of alternatives developed for the SELRP reflect differing patterns and levels of dredging and material removal, as well as resulting habitat distribution. As a result of dredging and grading activities proposed under each of the alternatives, material would be generated necessitating disposal/reuse. Dependent upon the suitability of the material, material removed from the lagoon could include disposal at offshore ocean and/or upland locations, beneficial reuse of the material through placement on the beach or nearshore, or reuse of the material on-site. Appropriate infrastructure improvements are also included in the proposed project and alternatives as necessary. Upon selection of a project alternative as part of this EIR/EIS process and the 404(b)(1) Alternatives Analysis, permits would be obtained and final design completed for the project.

If considered only in isolation, it can appear that certain goals or objectives of the project are solely for the benefit of one element of the lagoon, such as water quality or biology. However, lagoon functions, including water quality, hydraulic function, and biology, are interrelated and dependent upon each other. Project goals and objectives were developed together to result in a healthy and improved overall lagoon ecosystem. For example, to maintain healthy habitats that can support wildlife species throughout the lagoon, it is imperative to improve water quality and reduce eutrophication. Similarly, water quality and hydraulic function are critical to the survival of species in the lagoon ecosystem, such as fish that cannot survive the eutrophic conditions that occur when the inlet closes and benthic species that provide a foraging base for shorebirds. The lagoon system is an interrelated and connected ecosystem that should be restored through improvements to the suite of lagoon functions.

Implementation of the SELRP would result in certain trade-offs in terms of temporary impacts as described throughout this EIR/EIS necessary to achieve the positive long-term benefits of improved lagoon functions and services. For example, certain vegetation and habitats are growing successfully in the high-nutrient sediments currently in the lagoon. However, the presence of the high-nutrient levels is detrimental in multiple ways, such as degraded water quality, which contributes to a 303(d) listing for eutrophication under the CWA. Eutrophication leads to fish kills during warm weather, and potentially limits the ecological health of species and habitats within the lagoon. While restoration activities would temporarily affect emerging habitats (e.g., low-marsh in the central basin), long-term water quality benefits would improve lagoon function as a whole and ultimately result in a connected gradient of balanced habitat types that can be maintained for the long term; improved lagoon hydraulics, such as decreased water residence time resulting in decreased bacterial levels; hydrologic connectivity and sediment budget for the nearshore littoral zone; and others.

2.2 ALTERNATIVES DEVELOPMENT

NEPA and CEQA require the objective evaluation of a “reasonable” range of alternatives. Through comparison of these reasonable alternatives to a proposed project, the advantages of each can be weighed and analyzed. Under NEPA, reasonable alternatives are those that are practical or feasible from a technical and economic perspective, and based on common sense (46 Federal Register 18026, as amended; 51 Federal Register 15618). Section 15126.6 of the CEQA Guidelines requires that an EIR “describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.” Factors used to determine feasibility include site suitability, economic limitations, availability of infrastructure, consistency with local plans and policies, other plan or regulatory limitations, and jurisdictional boundaries.

The process of defining, evaluating, screening, and ultimately selecting a reasonable range of alternatives for detailed evaluation in this EIR/EIS involved government agencies, nonprofit organizations, the public, and other lagoon stakeholders. A broad range of alternative concepts were developed and considered. In 2008, a broad suite of alternatives were evaluated to narrow this range of alternatives to a reasonable number for more detailed engineering and environmental study. Based on subsequent evaluation through preliminary engineering and stakeholder coordination efforts, those alternatives were further refined to generate the proposed project and two alternatives that are evaluated in this document. As noted in the 2009 Alternatives Development Report, some alternatives considered the entire lagoon and other alternatives focused on key infrastructure elements (i.e., inlet and roadway/railroad choke points) or evaluated a single concept (avoid or reduce flooding on Manchester Avenue) (EDAW 2009).

The general alternatives screening process for lagoon restoration alternatives is provided below. Section 2.3 notes the alternatives carried forward in 2009, based on the Alternatives Development Report, summarizes the alternatives eliminated in later years based on subsequent evaluation, and lists the alternatives carried forward for further analysis. Since restoration of the lagoon could generate a substantial amount of dredged material to be disposed of and/or reused beneficially, Section 2.3 also discusses alternatives for materials disposal/reuse/beneficial reuse.

2.2.1 Lagoon Restoration Alternatives Screening Process

The Alternatives Development Report (EDAW 2009) described the screening process for lagoon restoration alternatives as follows:

Step 1: Generation of Alternative Concepts

- Describe alternative's basic characteristics
- Rationale for alternative

Step 2: Preliminary Screening of Alternative Concepts (Basic Fulfillment of Purpose and Need)

- Would the alternative maximize opportunities, such as the following:
    - Maximize tidal flushing
    - Enlarge tidal prism
    - Restore tidal circulation
    - Enhance and/or maintain species diversity
    - Improve water quality
- Would the alternative avoid or minimize constraints, such as the following:
    - Not worsen existing flood conditions at lagoon crossings (i.e., east of I-5 at Manchester Avenue)
    - Construction and long-term maintenance costs
    - Excessive sediment deposition
    - Impacts to offshore reef

  - Impacts to surf breaks and other recreational resources
  - Impacts to endangered species in upland areas
  - Impacts to riparian habitat
  - Disturbance of cultural resources

Step 3: Refinement of Conceptual Alternatives and Continued Feasibility Analysis

- Engineering feasibility
- Economic feasibility
- Environmental constraints

Step 4: Identification of Alternatives to Carry Forward for Detailed Analysis

Four conceptual alternatives, plus the No Project/No Federal Action Alternative, were carried forward for detailed analysis in 2009 (Section 2.3). Based on new information from subsequent engineering and environmental studies, these alternatives were screened again via the process above. One of the 2009 recommended alternatives was subsequently eliminated, and the remaining alternatives were renamed. This is described in Section 2.3. For the purposes of the Draft EIR/EIS, the alternative resulting in the largest level of impact was identified as the proposed project. This designation was made for procedural purposes and did not reflect a predisposition for implementation of that alternative. Alternative 1B-Refined is identified as the Agency Preferred Alternative in this Final EIR/EIS based on information in this document, and is identified as the LEDPA in the Draft 404(b)(1) Alternatives Analysis attached as Appendix O. Final Corps determination on the LEDPA will be made in the ROD.

2.2.2 PROJECT ALTERNATIVES CONSIDERED BUT REJECTED

Over the life of the project, various options for restoration of the lagoon have been considered. More recently, various options for disposal of material dredged from the lagoon have also been considered. However, the focus of the proposed project is lagoon restoration, as documented in the Purpose and Need, so while there may be varying benefits associated with various disposal options, the key selection criteria remain linked to the restoration element. The following sections highlight the lagoon restoration alternatives and the material disposal alternatives that were considered but have been rejected from further analysis.

Lagoon Restoration Alternatives Considered but Rejected

Lagoon restoration alternatives considered but rejected as part of the 2009 Alternatives Development Report are described in detail in that document. Table 2-1 provides a brief

Table 2-1
Alternatives Considered and Recommendations per 2009 Alternatives Development Report

Name of Alternative (from Source Document)	Brief Description	Channel Width Measurements			Relocate Inlet?	Carried Forward or Eliminated?
		I-5 Bridge	NCTD RR	PCH & Inlet		
No Action (Required per CEQA and NEPA)	Existing conditions remain. No dredging, excavation, or modifications to channel widths would occur.	130 feet	130 feet	105 feet	No	Carried forward.
Alternative 1 (2009 Alternatives Development Report)	Retain existing inlet location but increase width of channel openings for the PCH bridge and railroad trestle. Includes the creation of a sediment trap and avian islands, and the grading of various basins within the lagoon. Approximately 160,000 cubic yards would be exported from the lagoon and disposed offshore.	130 feet	490 feet	130 feet	No	Carried forward.
Alternative 2A (2009 Alternatives Development Report)	Retain existing inlet location but increase width of channel openings for the PCH bridge, Interstate 5 (I-5) bridge, and railroad trestle. Includes the creation of a sediment trap and avian islands, and the grading of various basins within the lagoon. Approximately 1.2 million cubic yards (mcy) would be generated for disposal/reuse by the alternative.	260 feet	490 feet	130 feet	No	Carried forward.

Name of Alternative (from Source Document)	Brief Description	Channel Width Measurements			Relocate Inlet?	Carried Forward or Eliminated?
		I-5 Bridge	NCTD RR	PCH & Inlet		
Alternative 2B (2009 Alternatives Development Report)	Construct a new inlet south of the restaurants and close the existing inlet. Increase width of channel openings for the PCH bridge and railroad trestle. Includes the creation of a sediment trap and avian islands, and the grading of various basins within the lagoon. Approximately 1.4 mcy would be generated for disposal/reuse by this alternative.	260 feet	590 feet	200 feet	Yes	Carried forward.
Alternative 3 (2009 Alternatives Development Report)	Construct a new inlet south of the restaurants and close the existing inlet. Increase width of channel openings for the PCH bridge, I-5 bridge, and railroad trestle. Also includes creation of a sediment trap and avian islands, and the grading of various basins within the lagoon.	260 feet	590 feet	200 feet	Yes	Carried forward in 2009, but eliminated in 2011. *Significant ecological impacts without substantial hydraulic/ecological benefit* – This alternative would have created subtidal basins extending through most of the central basin and a large portion of the east basin. While additional tidal prism could be achieved with this alternative, less extensive changes were shown to provide a tide range approximating the open ocean, and impacts to existing sensitive habitat would have been substantial. Resulting habitat distribution would have been decreased overall compared to other alternatives, and would not have achieved the project objectives in that respect.
Alternative 2 – Culvert (2006 Optimization Study)	Move inlet south of restaurants; close existing inlet and create a parallel culvert under I-5 bridge.	130 feet	590 feet	200 feet	Yes	Eliminated. *Too expensive without significant ecological benefit* – The addition of a culvert under I-5 would not achieve a substantial hydrologic benefit within the lagoon and would incur a substantial cost for construction.

Name of Alternative (from Source Document)	Brief Description	Channel Width Measurements			Relocate Inlet?	Carried Forward or Eliminated?
		I-5 Bridge	NCTD RR	PCH & Inlet		
Alternative 2 – Max (2006 Optimization Study)	Complete removal of I-5 berm within the lagoon boundary, replacing the berm with habitat (likely unvegetated due to shade impacts from structure).	n/a	590 feet	200 feet	No	Eliminated. *Too expensive without significant ecological benefit* – The removal of the I-5 berm completely within the lagoon boundary would primarily increase the area available for wetland/aquatic habitat within the lagoon (by approximately 9 acres). The hydrologic benefit to the lagoon would be minimal, as hydraulic studies indicate that fluvial muting is minimized by a structure measuring 80 meters in length (as proposed in Alternatives 2A and 2B). Substantial design and construction costs would have been incurred with construction of a raised bridge structure across the lagoon.
Location 2 (Old Alt 2) (2001 Feasibility Study)	Move inlet to north of Charlie's/restaurants.	n/a	n/a	n/a	Yes	Eliminated. *Significant ecological impacts without removing hydrologic inefficiencies* – Would provide more of a straight channel for the lagoon to help promote tidal flushing. Inlet closure issues would still be anticipated, however, because the majority of the existing sinuous channel would remain and would continue to slow outflow. In addition, an offshore reef is located in this location and would continue to prevent larger tidal prism and sediment transport offshore. Channeling through the reef was briefly considered as part of this alternative to allow for sand transport offshore; however, this alternative would create a number of ecological and community issues without solving the hydrologic inefficiencies within the lagoon itself. Inlet maintenance dredging would still be needed to keep the inlet mouth open. In addition, the inlet location would be too constrained in size for locating a sedimentation basin.

Name of Alternative (from Source Document)	Brief Description	Channel Width Measurements			Relocate Inlet?	Carried Forward or Eliminated?
		I-5 Bridge	NCTD RR	PCH & Inlet		
Alternative 3b: Location 3 (2003 Corps Meeting Series)	Move inlet south of restaurants but no sedimentation basin.	n/a	n/a	n/a	Yes	Eliminated. *Decreased sediment flushing and increased maintenance* – Relocation of the inlet to south of the existing restaurants would enhance hydrologic functioning within the lagoon and would provide a natural channel for offshore sediment transport. Eliminating the construction of a sedimentation basin within the lagoon would substantially reduce the ability of the lagoon to flush accumulated sediments during ebbing tides. Associated maintenance with keeping the inlet open without frequent maintenance dredging would increase long-term costs.
Alternative 4a: Submerged Pipeline (2003 Corps Meeting Series)	Submerged pipeline with improving existing inlet.	n/a	n/a	n/a	No	Eliminated. *Would not accomplish overall purpose of the project* – Would not solve hydraulic inefficiencies within the lagoon because it would maintain the existing inlet, which does not allow for adequate sediment transport due to small tidal prism and tidal muting. Although existing inlet would be improved, maintenance would still be required due to sinuous water channel. Additional pipeline would provide only localized benefit and would not alter sedimentation within the lagoon or habitat transition.
Alternative 4b: Submerged Pipeline (2003 Corps Meeting Series)	Submerged pipeline without improving existing inlet.	n/a	n/a	n/a	No	Eliminated. *Would not accomplish overall purpose of the project* – Would not solve hydraulic inefficiencies within the lagoon because it would maintain the existing inlet, which does not allow for adequate sediment transport due to small tidal prism and tidal muting. Frequent maintenance would be required due to sinuous water channel and tidal muting. Additional pipeline would provide only localized benefit and would not alter sedimentation within the lagoon or habitat transition.

Name of Alternative (from Source Document)	Brief Description	Channel Width Measurements			Relocate Inlet?	Carried Forward or Eliminated?
		I-5 Bridge	NCTD RR	PCH & Inlet		
Alternative 5 (2008 Stakeholder Meetings)	Reduce elevation of mudflats and dredge some subtidal areas in the west and central basins.	n/a	n/a	n/a	No	Eliminated as a stand-alone alternative but carried forward as design feature. *Would not solve tidal prism issues* – This alternative would include dredging within the lagoon itself to create more mudflats and subtidal areas within the west and central basins.
Dual Inlets (2003 Corps Meeting Series)	Create a second inlet in a second location and maintain/improve existing inlet location.	n/a	n/a	n/a	No	Eliminated. *Too expensive with extensive maintenance issues and no significant ecological benefits* – This alternative would not solve existing maintenance issues at the existing inlet, and it may exacerbate sedimentation within the existing inlet if tidal muting is increased even further by less outflow during ebbing tides. Creation of the second inlet would incur substantial costs but, by splitting the flow between two locations, may not result in as much benefit hydraulically as allowing a single inlet to be maintained.
Long Jetties (2003 Corps Meeting Series)	Construct a short jetty at inlet mouth.	n/a	n/a	n/a	n/a	Eliminated. *Would not accomplish overall purpose of the project* – Construction of jetties would slow the accumulation of sand and cobble in the inlet and decrease the amount of maintenance required to keep the inlet open; however, construction of long jetties extending into the surf zone may change the shoreline and the character of the surf break that occurs in the area. Construction of jetties may also create impacts to the visual environment and create restrictions to access.

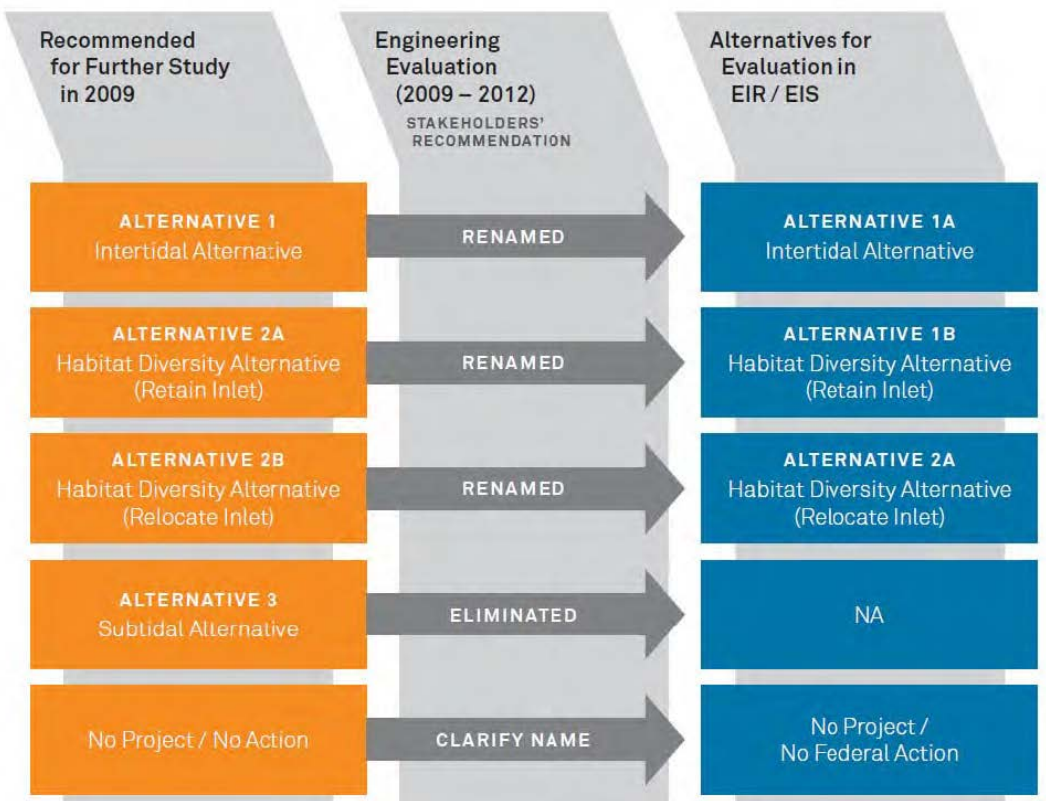
n/a = not applicable
NCTD RR = North County Transit District railroad
PCH = Pacific Coast Highway (i.e., Coast Highway 101)
Corps = U.S. Army Corps of Engineers

description of alternatives brought forth in a variety of studies and states recommendations from the time of development. Due to the range of sources these alternatives were derived from, the numbering and naming conventions in Table 2-1 do not follow a cohesive pattern.

Alternatives 1, 2 (with variations A and B), 3, and the No Project/No Federal Action Alternative were carried forward into subsequent study, primarily engineering studies and discussion with the stakeholder group (from 2009 through 2012). Specifically, these alternatives were evaluated for sediment characterization, resilience to sea level rise, hydraulic improvements, water quality characteristics, ebb bar and flood shoaling, tidal muting, shoreline morphology effects, inlet stability, surfing impacts, maintenance dredging requirements, materials disposal/reuse opportunities and constraints, and construction methods.

At a stakeholder meeting on September 6, 2011, Alternative 3 was eliminated because it would result in significant ecological impacts without substantial hydraulic/ecological benefits. Also, the numbering/naming convention was modified. Figure 2-2 provides a schematic of the alternatives screening/name changes.

Figure 2-2
2009–2012 Alternative Screening Flowchart



Continued refinement of the alternatives has occurred based on agency and stakeholder input. Over the course of the multi-year planning process, efforts have also been made to modify alternatives to minimize impacts to habitat even as that habitat continues to transition.

Materials Disposal Alternatives Considered but Rejected

The proposed project and alternatives would generate up to 1.4 mcy of excess material that must be disposed to achieve lagoon restoration, as detailed in Table 2-1. Table 2-2 describes the potential materials disposal locations. SANDAG, as well as state and local agencies, has identified reuse of such disposal material for littoral cell nourishment (this encompasses the onshore and nearshore sand as it cycles seasonally, and is further described in Section 3.3) as a priority when of suitable quality; therefore, the SELRP evaluates both disposal and reuse options. A construction approach creating an on-site overdredge pit would enable the project to provide suitable material for reuse, while allowing for on-site disposal of material that would otherwise have to be disposed of off-site. This approach essentially overexcavates deeper, coarse-grained sandy material from a pit within the site for reuse on beaches and in the nearshore. That pit can then provide an on-site disposal site for finer-grained material produced from more shallow grading and dredging. The screening process used to develop materials disposal/reuse alternatives is described in the following steps:

- Step 1: Identify Potential Disposal Locations
    - Upland
    - Offshore Disposal
- Step 2: Consider Beneficial Reuse Options that support the goals of the Coastal Regional Sediment Management Plan (RSM Plan) implemented by SANDAG and has potential to comply with the Inland Testing Manual (ITM) and Ocean Disposal Manual (ODM).
    - Nearshore Placement
    - Onshore Placement at Previously Evaluated/Permitted Sites
        - Sand Compatibility and Opportunistic Use Program (SCOUP)
        - Regional Beach Sand Project (RBSP)
        - Corps’ Encinitas-Solana Beach Coastal Storm Damage Reduction and Beach Nourishment Project
    - Offshore Placement in Designated Placement Sites for Future Stockpile Resource
    - Reuse for Construction Fill
- Step 3: Evaluate Constructability
    - Proximity
    - Cost

Table 2-2
Potential Locations for Materials Disposal

	Potential Disposal Locations	Reasoning for Location Selection
Offshore	LA-5	Some dredged material would be fine grained and therefore not of suitable quality for beneficial reuse. This EPA-designated disposal location is intended for disposal of such material.[3]
	SO-5/SO-6[1]	Stockpiling of materials outside littoral zone as a sediment source for future beneficial reuse (e.g., beach nourishment).
Nearshore	Cardiff	Materials placement inside littoral zone for indirect beach nourishment.
Onshore[2] (beach placement)	Cardiff	Proximity to the project area; specific placement site boundaries not previously identified as part of previously approved or planned beneficial reuse project/program (overlapping but larger than previously used Regional Beach Sand Project [RBSP] sites).
	Oceanside	Sand Compatibility and Opportunistic Use Program (SCOUP) receiver sites.
	Carlsbad	
	Encinitas – Moonlight	
	Encinitas – Batiquitos	
	Solana Beach	
	Oceanside	RBSP receiver sites.
	North Carlsbad	
	South Carlsbad North	
	Batiquitos	
	Leucadia	
	Moonlight Beach	
	Cardiff	
	Solana Beach	
	Torrey Pines	
	Encinitas	Encinitas-Solana Beach Coastal Storm Damage Reduction and Beach Nourishment Project receiver sites.
	Solana Beach	
Onshore (non-beach)	Various locations near lagoon (e.g., railroad trestle, I-5, or Coast Highway 101 construction needs)	Reuse as fill for the proposed project or other infrastructure improvements or construction of transition and nesting areas.
	Landfill	Disposal at upland landfill.

Note: Any placement of material within the littoral zone, including offshore stockpiling, nearshore, or onshore beach placement, would require creation of an overdredge pit on-site as part of the disposal strategy.

[1] SO-5 and SO-6 are designated placement sites located in the ocean outside the littoral depth of closure, or sand supply seasonally cycling between the nearshore and beaches. These sites were identified in the RBSP Environmental Impact Report and Environmental Assessment (SANDAG 2001, 2011) as sand sources for beach nourishment; approval to utilize the sites for offshore stockpiling for future projects would be obtained by the SELC as part of the permitting process associated with the proposed SELRP. As part of placement authorization by the Corps and EPA, additional testing may be conducted to ensure that the site would not be degraded. If authorization is not obtained, this location would not be used for placement.

[2] Most north county coastal cities have adopted a SCOUP to allow opportunistic, beach-quality material to be placed at identified receiver sites. The cities of Oceanside, Carlsbad, Encinitas, and Solana Beach have approved CEQA documents and necessary permits for SCOUP. SANDAG's RBSP was implemented in fall 2012 and placed 1.4 mcy of sand on eight receiver sites between Oceanside and Imperial Beach. It is like the first RBSP in 2001 that placed 2.1 mcy on 12 receiver sites in similar footprints. Both projects had approved CEQA/NEPA documents and permits that addressed one-time placement; approval to utilize these sites for the SELRP would be obtained by the SELC as part of the permitting process associated with the proposed project. The Storm Damage Reduction Project proposes to place up to approximately 1.4 mcy of material on beaches in these two cities. Current status of that project is discussed in Chapter 5.

[3] LA-5 is one of 12 existing EPA-designated ocean disposal sites for dredged material in Region 9. Each site is managed according to a Site Management and Monitoring Plan. Preliminary coordination with the Corps and EPA indicates that the material appears to be suitable for disposal at LA-5. If Alternative 1A is selected for implementation, additional testing in accordance with ODM and coordination would be conducted prior to authorization for disposal at the site.

Table 2-2 identifies the potential disposal and beneficial reuse locations and provides further reasoning for location selection.

With the potential locations for materials disposal/reuse and beneficial reuse identified, a number of preliminary disposal scenarios were developed. Table 2-3 describes the preliminary disposal scenarios and states whether scenarios were carried forward or eliminated from further analysis. Additional ITM and/or ODM testing may be required prior to Corps and EPA approval of the materials disposal/reuse scenarios.

Table 2-3
Preliminary Materials Disposal/Reuse Scenarios Considered

Scenario	Description	Carried Forward or Eliminated
LA-5 Disposal	Material would be primarily disposed of offshore in LA-5. Minimal amounts would be placed in the nearshore at Cardiff. No onshore sand placement would occur.	Selected components carried forward. ODM Tier 3 testing would be completed, as needed.
Landfill	Material would be disposed of in an upland landfill.	Eliminated: Material would require dewatering and over 15,000 truck trips to haul off-site.
SCOUP Receiver Sites and Nearshore Cardiff	Material would be placed onshore within approved Sand Compatibility and Opportunistic Use Program (SCOUP) receiver sites closest to the project site, including Oceanside, Carlsbad, Moonlight Beach, Batiquitos, and Solana Beach. Material would also be placed nearshore at Cardiff.	Eliminated: Currently authorized SCOUPs are too restrictive to allow effective construction (e.g., delivery from sea; nighttime construction).
RBSP Receiver Sites and Nearshore Cardiff	Material would be placed onshore within previously permitted RBSP receiver sites closest to the project site, including North Carlsbad, South Carlsbad North, Batiquitos, Leucadia, Moonlight Beach, Solana Beach, and Torrey Pines. Material would also be placed onshore and nearshore at Cardiff.	Selected RBSP receiver sites carried forward with a combination of nearshore and onshore at Cardiff.
Encinitas-Solana Beach Coastal Storm Damage Reduction and Beach Nourishment Project Receiver sites and Nearshore Cardiff	Material would be placed onshore at planned Shoreline Protection Project receiver sites in Encinitas and Solana Beach. Materials would also be placed nearshore at Cardiff.	Eliminated: Although project has been conceptually approved, funding has not been identified, and uncertainty of implementation in current fiscal environment makes consideration of this scenario too speculative at this time.
Borrow Site Stockpile	Material would be placed in sites SO-5 and SO-6 previously used as borrow sites for the 2001 and 2012 RBSPs and nearshore at Cardiff.	Carried Forward

Scenario	Description	Carried Forward or Eliminated
Reuse for Fill	Material would be reused as fill for construction projects near the lagoon, such as infrastructure improvement to the North County Transit District railroad and Coast Highway 101. Construction of Interstate 5 is not anticipated to require fill.	Eliminated: Although the project may generate some material appropriate for reuse as fill, volumes would be small and establishing a batch plant to process the material into fill would not be efficient.

The scenarios carried forward in Table 2-3 were then refined to reflect constructability, defined primarily by proximity to the lagoon and associated lower transport cost. A refined materials disposal and reuse approach was defined, as outlined in Table 2-4, that would accommodate volumes of material anticipated to be produced by the SELRP for modeling and engineering purposes. Maximum potential placement volumes have been identified for each site based on historic project site boundaries from RBSP or specific SELRP needs. These maximum volumes are addressed in this EIR/EIS for disclosure of potential effects associated with materials placement at each site, but it is anticipated less volume would be placed at some locations because the overall capacity exceeds disposal volume needs.

Table 2-4
Materials Disposal and Beneficial Reuse Alternatives
Carried Forward for Further Analysis

Type of Materials Placement	Potential Disposal Locations
Offshore Disposal	LA-5
Offshore Stockpiling (outside littoral cell)	SO-5/SO-6
Nearshore (inside littoral cell)	Cardiff
Onshore (beach placement)	Cardiff
	Leucadia
	Moonlight Beach
	Solana Beach
	Torrey Pines

2.3 PROJECT ALTERNATIVES CARRIED FORWARD

An EIR is required to evaluate the effects of a proposed project and its alternatives on the environment. An EIS is required for major federal actions significantly affecting the human environment and discloses those significant impacts. The SELRP was designed by a stakeholder-driven process. The analysis within this document and associated stakeholder/public input through the environmental process will drive selection of the Agency Preferred Alternative and the Environmentally Preferred Alternative. Based on the iterative screening process described in

Section 2.2.1, three project alternatives were identified and recommended for detailed evaluation in this EIR/EIS. The preliminary LEDPA has been identified as Alternative 1B – Refined through the Section 404(b)(1) Alternatives Analysis, as described in the Preface of this EIR/EIS and attached as Appendix O. This alternative also represents the CEQA Agency Preferred Alternative and NEPA Environmentally Preferred Alternative, subject to a final LEDPA determination in the Corps' ROD. All alternatives identified in the Draft EIR/EIS were analyzed at an equal level of detail to facilitate identification of the LEDPA and ultimate selection of an alternative for implementation. This Final EIR/EIS continues to evaluate alternatives at an equal level of detail in the event that the Final 404(b)(1), which will be included in the ROD, determines a different LEDPA from Alternative 1B – Refined. The alternatives addressed in this EIR/EIS include:

- Alternative 2A
- Alternative 1B
- Alternative 1A
- No Project/No Federal Action Alternative

The project involves several design elements/considerations common to each alternative, although the degree to which each element is included in each alternative may differ (e.g., acreage of dredging or grading); an overview of the common elements is provided in Table 2-5. Detailed information about Alternative 2A is contained in Section 2.4. Sections 2.5 through 2.7 provide information about Alternative 1B and Alternative 1A, plus the No Project/No Federal Action Alternative. Section 2.8 provides a comparison of the project alternatives.

Table 2-5
Overview of Design, Construction, Post-Construction Elements Common to the Project Alternatives (Excluding No Project/No Federal Action)

Habitat Changed due to Dredging/Grading Activities	
Direct dredging or grading for habitat conversion/creation	The SELRP[1] would reconfigure the lagoon to remove high-nutrient sediments that cause eutrophication in the lagoon. In the process of sediment removal, the project would create elevations with appropriate inundation frequencies to support specific habitat types. Generally, habitats range in elevation from mid- to high-saltmarsh (pickleweed dominated), to low-saltmarsh (cordgrass dominated), to intertidal mudflats, and finally to subtidal (submerged) lands.
Habitat impacts through extended flooding/inundation	Alternative 2A and Alternative 1B would flood portions of the lagoon in order to complete dredging activities within specific areas designated for shallow dredging. This inundation of habitat could result in habitat impacts that would require time for recovery.

Habitat Changed due to Dredging/Grading Activities (Cont'd.)	
Creation of nesting and transitional habitats	Each of the project alternatives incorporates the strategy of utilizing dredged materials to create man-made transitional areas to supplement existing natural transitional areas located around the lagoon perimeter. This creation helps increase the lagoon's resiliency to sea level rise in the future. Additionally, some excavated material would be used on-site to create a nesting area adjacent to the NCTD access road in the central basin, in the location of the former sewage ponds.
Indirect habitat conversion/creation	Even where the SELRP would not have direct changes to the lagoon, there may be changes to inundation frequency from enhanced tidal influence or freshwater drainage that may change habitat types.
Changes to the Existing Channels/Inlet Configurations	
Changes to bridge structures or channel deepening (I-5 and NCTD railroad); changes to the ocean inlet and Coast Highway 101.	Each alternative incorporates increases in cross-section dimensions at existing or proposed bridge crossings by lengthening the span and/or deepening channels beneath the structure. Specific channel dimensions for each alternative and identified in the I-5 North Coast Corridor Project EIR/EIS (SCH #2004101076). Dimensions are discussed in Sections 2.4 through 2.7. Channel bank and bridge abutment protection would be required to protect channels and structures from possible undermining due to ongoing erosion during severe storm flow events. Rock armoring would be placed directly along the toe of bridge abutments and would "wrap" around the end of the earthen berms supporting each bridge. This armoring would be completed at each of the bridge crossings as part of this project, including Coast Highway 101, the NCTD railroad, and I-5.
I- 5 Freeway Bridge over San Elijo Lagoon	Caltrans plans to improve I-5 from La Jolla Village Drive in San Diego to Harbor Drive in Oceanside and the I-5 bridge over San Elijo Lagoon would be modified with a length that could accommodate lagoon restoration by that project, as determined by a bridge optimization study conducted by Caltrans (M&N2012). The I-5 North Coast Corridor Project Draft EIR/EIS was released for public review in July 2010 (SCH #2004101076). A Supplemental Draft EIR/EIS was released in August (Caltrans 2012) and the Final EIR/EIS was issued in October 2013 to support selection of the Locally Preferred Alternative. Construction is anticipated to begin in 2016. The bridge facility is part of the I-5 North Coast Corridor Project and is not evaluated as part of the SELRP.
NCTD Railroad	Railroad improvements are being planned and implemented by SANDAG, in partnership with NCTD, to accommodate double tracking of the rail line. In San Elijo Lagoon, a new bridge would be constructed at a higher elevation or retained by that project, depending on the SELRP alternative selected for implementation. Impacts associated with implementation of the NCTD railroad improvements are disclosed in the 2007 Final Program EIR/EIS for the Los Angeles to San Diego Proposed Rail Corridor Improvements (LOSSAN) (SCH #2002031067) and are not evaluated as part of the SELRP. Construction of railroad improvements is anticipated to begin in 2016.

Changes to the Existing Channels/Inlet Configurations (Cont'd.)	
Coast Highway 101/San Elijo Lagoon Inlet	There is an existing bridge on Coast Highway 101 that crosses the existing lagoon inlet. Alternative 2A requires a new inlet and a new bridge for Coast Highway 101. For Alternative 1B and Alternative 1A, the inlet and bridge would remain in place. In its current condition, the existing bridge is seismically inadequate and should be retrofitted. Seismic retrofits would be constructed by others; however, potential environmental impacts associated with this change to Coast Highway 101 are evaluated in this document.
CDFW Weir and Dike	There is an existing weir east of I-5 and a north-south earthen berm/dike on either side that provides a trail to cross the lagoon. The dike has two gated culverts that were historically used to control water levels in the east basin; these gates are currently left open, however, and active management of water levels does not occur. Under Alternative 2A and Alternative 1B, that dike/weir would be removed as part of this project. In Alternative 1A, the dike would remain with two new openings to allow tidal and fluvial connections. Improvement of the channel in this location would reduce sedimentation east of the CDFW dike.
Sea Level Rise Resiliency	
Increase in sea level incorporated into planning to allow for long-term resiliency of the lagoon.	State-funded projects are advised to plan for conditions consistent with those specified in the California State Coastal Conservancy's (SCC) Guidance for Addressing Climate Change in California Coastal Conservancy Projects (SCC 2012). These are assumed to be: • 60 centimeters or 24 inches (2 feet) by Year 2065 (50 years after construction) • 139 centimeters or 55 inches (4.6 feet) by Year 2100 The restoration project strives to create a system that is resilient to different sea level elevations over time, given appropriate adaptive management strategies.
Materials Disposal/Reuse	
Lagoon sediment characteristics	San Elijo Lagoon contains an approximately 3-foot layer of fine sediment overlying a much coarser sand base. The fine sand is not appropriate for beneficial reuse, but the coarse sand is. The fine material is also difficult to dispose of off-site in a cost-effective manner. Both state and local coastal policies encourage the reuse of suitable material to nourish littoral systems.
Engineering solutions	A typical approach in lagoon restoration projects is to overexcavate a basin to create a large pit. The coarse sand from the pit is likely suitable for reuse. The finer sediments that are not of suitable quality (grain size too small) to be beneficially reused are then backfilled into the pit. The pit is capped with a layer of coarse sandy material. This method avoids removal of the fine materials onto adjacent lands, storage for dewatering, and then trucking for upland disposal. Depending on the volume of fines, the amount of land needed for dewatering, and the number of truck trips can render this option highly problematic. The overexcavation approach is most feasible for the quantities associated with this project and is incorporated into the construction strategy for Alternative 2A and Alternative 1B. This approach would also enable the project to remove nutrient-rich sediments in the lagoon. Additional on-site disposal options would also be implemented, including the use of sediments for the creation of man-made transitional and nesting areas, as described above.

Relocation, Protection, and Management of Recreational Uses	
Reserve has 7 miles of trails as well as a Nature Center.	Restoration of the lagoon would reroute some of the existing trails in the east basin and may require temporary closures in other areas during construction to maintain public safety. Throughout construction, alternative access would be maintained to the beach and areas adjacent to the lagoon.
Long-Term Maintenance and Adaptive Management	
Inlet and Channel Maintenance	The inlet is currently opened via mechanical means, typically annually. In the long term, maintenance of the inlet, subtidal/sedimentation basin, and channels would be required, as well as invasive species removal in restored areas. To minimize sediment escaping the basin and channels and settling in restored habitat, dredging or manual excavation of the inlet and sedimentation basin or channels would be conducted once the sedimentation basin's capacity is reached or the inlet's ability to remain open is compromised. Additional channel maintenance may also be required in the future to remove sedimentation and vegetation.
Adaptive Management	Systematic long-term monitoring would occur to track changes to the lagoon in the context of the physical and biological objectives outlined in Section 1.2. An overview discussion of long-term maintenance and adaptive management is provided in Section 2.11, and anticipated areas that may require adaptive management and maintenance activities are identified. That plan is best finalized once the Agency Preferred Alternative is selected.

[1] The SELRP refers to each of the project alternatives (e.g., Alternative 2A, Alternative 1B, and Alternative 1A) unless otherwise specified.

2.4 ALTERNATIVE 2A HABITAT DIVERSITY (RELOCATED INLET)

The proposed project in the Draft EIR/EIS, Alternative 2A, would improve tidal action by constructing a new inlet south of the existing feature. This inlet would require stabilization through the incorporation of cobble blocking features (CBFs) at the beach and development of a "prefilled ebb bar" in the nearshore outside the new outlet location. A new bridge along Coast Highway 101 would also be constructed to span the proposed new inlet location, and would incorporate a dedicated pedestrian sidewalk to ensure uninterrupted pedestrian access along the shoreline. The increased tidal action from the new inlet would also create a more connected gradient of balanced habitat types than currently exists. Figure 2-3 illustrates the conceptual plan under Alternative 2A.

With this alternative, a new subtidal basin would be created just landward of the new inlet in the west and central basins to capture sediment entering the lagoon. The main tidal channel would be widened and redirected just west of I-5, and would then extend into the east basin. The existing channel in the east basin would be widened substantially and the existing weir would be removed. These actions would promote more tidal exchange east of I-5 and allow more freshwater flows to exit the lagoon. Dredging, particularly in the central basin, would remove nutrients bound in lagoon sediments that can lead to eutrophication. A utility pole located just east of the railroad track would be relocated to accommodate the sedimentation basin. The existing trail along the weir would be replaced with a pedestrian bridge under I-5, which would allow for connections between existing trails along the east side of I-5. Some nontidal habitat areas would remain in the east basin, including the “island” of freshwater/brackish marsh in the center of this basin. Man-made transitional habitat would be created by filling on top of, and alongside, the remnants of the weir. This habitat is intended to provide refugia, an area that is preserved (not impacted) for species to retreat to, in the form of continually transitioning habitat over time as sea level rises. Three other areas of man-made transitional habitat above tidal elevations would be created in the central basin. Together, these would supplement the natural transitional habitat occurring in a band around the perimeter of the lagoon.

2.4.1 HABITAT DISTRIBUTION

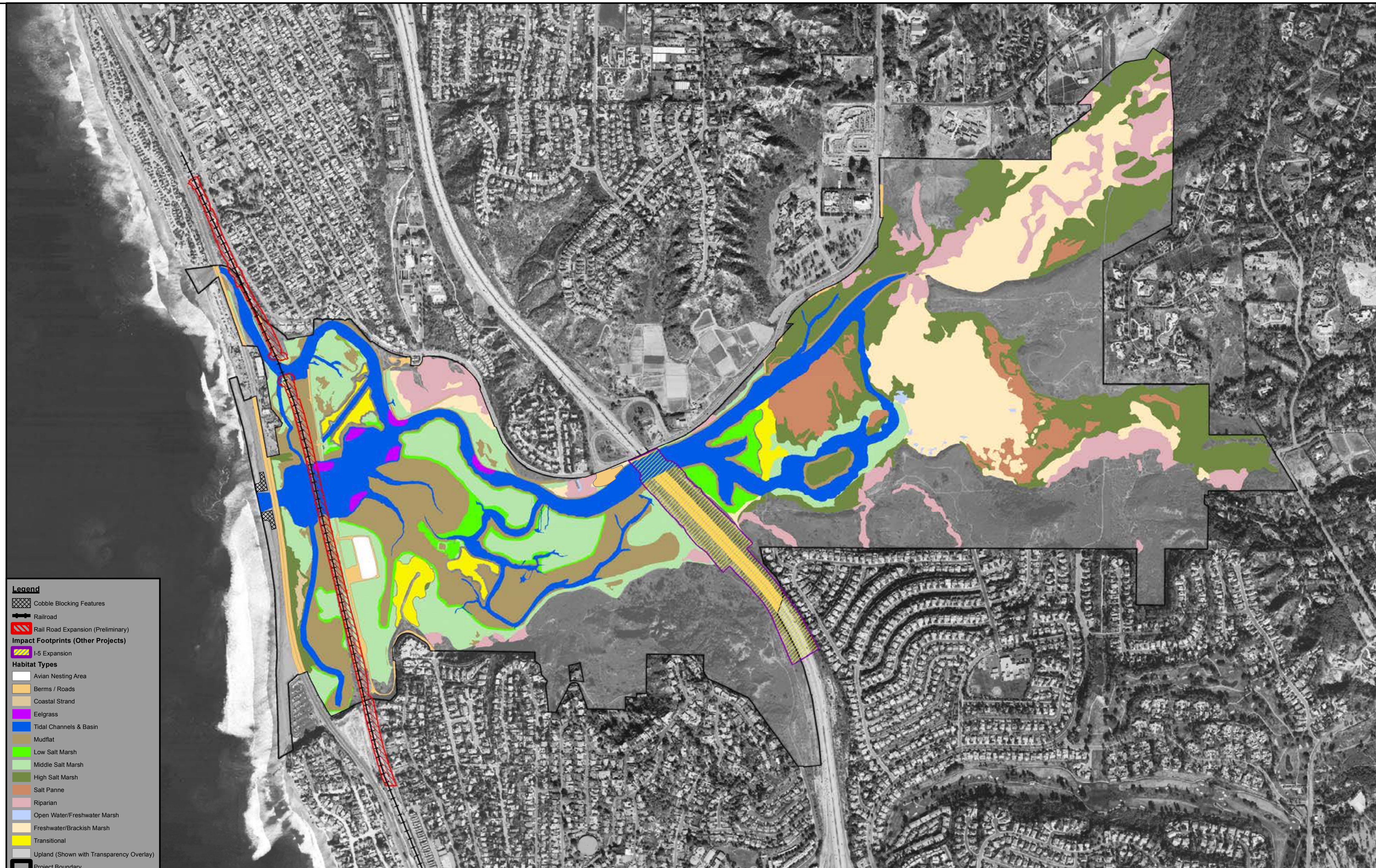
A proposed habitat distribution plan was developed for Alternative 2A to provide a connected gradient of balanced habitat types that would remain relatively stable through time, assuming consistent maintenance, as described in Section 2.11. Table 2-6 identifies the habitat distribution that is projected under Alternative 2A.

Table 2-6
Alternative 2A –Habitat Distribution

Habitat Type	Habitat Distribution (acres)		Habitat Type	Habitat Distribution (acres)	
	Existing[1]	Proposed		Existing[1]	Proposed
Avian Nesting Areas	0	2	Open Water/Tidal Channels and Basins	40	74
Mudflat	63[2]	102	Riparian	72	67
Low-Marsh	13	23	Coastal Strand	5	5
Mid-Marsh	141	124	Upland & Others	299	292
High-Marsh	120	107	Beach	15	14
Salt Panne	37	17	Berms and Roads	23	24
Freshwater/Brackish Marsh	132	96	Transitional (man-made)	0	12

[1] Existing habitat acreages are from 2012 mapping efforts and reflect habitat distributions at that time.
[2] Current functioning mudflat is an artifact of past freshwater impoundment and is converting to low- and mid-marsh because it is not at a natural elevation for self-sustainable mudflat.
Source: Nordby and M&N 2012

The primary change in habitat distributions under Alternative 2A would be an increase in open water areas/tidal channels and mudflat habitat within the lagoon compared to existing conditions.



0 275 550 1,100 Feet

Figure 2-3
Alternative 2A

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Open water areas and tidal channels would be increased in all three lagoon basins compared to existing conditions. Mudflat and open water/tidal channels would be actively created throughout the central basin and replace existing mid-marsh and low-marsh habitat. Soils within proposed mudflat areas would be either native soils lowered slightly in elevation or soils slurried from shallow excavation of the lagoon basins and placed on top of the sand cap on the overdredge pit in the central basin. In both cases, the exposed mudflat soils would consist of native marsh soils that contain native infauna that would serve as seed for a diverse benthic assemblage and provide suitable foraging for shorebirds. Similarly, open water/tidal channels and low-marsh would be actively created in the east basin where freshwater/brackish marsh currently exists. Increases to estuarine habitat (low, mid, and high-marsh) may also occur as a result of conversion of salt panne and freshwater/brackish marsh in the far east basin as tidal expression increases. It is anticipated that, with the creation of a new inlet, the existing inlet would eventually close due to sand and cobble from nearshore littoral transport and would not be actively filled by the project. Therefore, a minimal change of beach habitat would result.

This alternative also includes the creation of 12 acres of man-made transitional habitat in both the east and central basins. In addition to transitional habitat intentionally created by fill from this project, the modified hydrology resulting from grading and the removal of the CDFW dike would result in the expansion of the natural transition zone throughout the site but particularly in the east basin. This alternative would fill a former sewage settling pond in the central basin and cap it with 2 feet of sand topped with crushed shell to enhance opportunities for California least tern nesting. Final design of the nesting area would be determined in consultation with state and federal wildlife agencies and may include additional sculpting, provision of signs deterring access topped with anti-perch devices to reduce the potential for perching diurnal and nocturnal raptors, details for substrate requirements and coloration, evaluation of fencing, and direct continuity to nonvegetated mudflats (where possible).

2.4.2 Channel and Infrastructure Improvements

As noted in Table 2-5, Alternative 2A would result in changes to existing channel and inlet configurations at the existing inlet, Coast Highway 101, the NCTD railroad tracks, and the I-5 bridge. Changes to the I-5 and NCTD crossings would be implemented by others, but changes to Coast Highway 101 are included in the proposed project. Table 2-7 lists the existing and proposed dimensions for each.

Table 2-7
Alternative 2A –Inlet and Channel Dimensions

	Coast Highway 101/Inlet		Railroad Trestle		I-5 Bridge	
	Bottom Width (feet)	**Invert (feet, NGVD)**	**Bottom Width (feet)**	**Invert (feet, NGVD)**	**Bottom Width (feet)**	**Invert (feet, NGVD)**
Existing	105	-0.87	187	-0.87	130	0.74
Alternative 2A	200[1]	-6.5	590	-7	261	-6.5

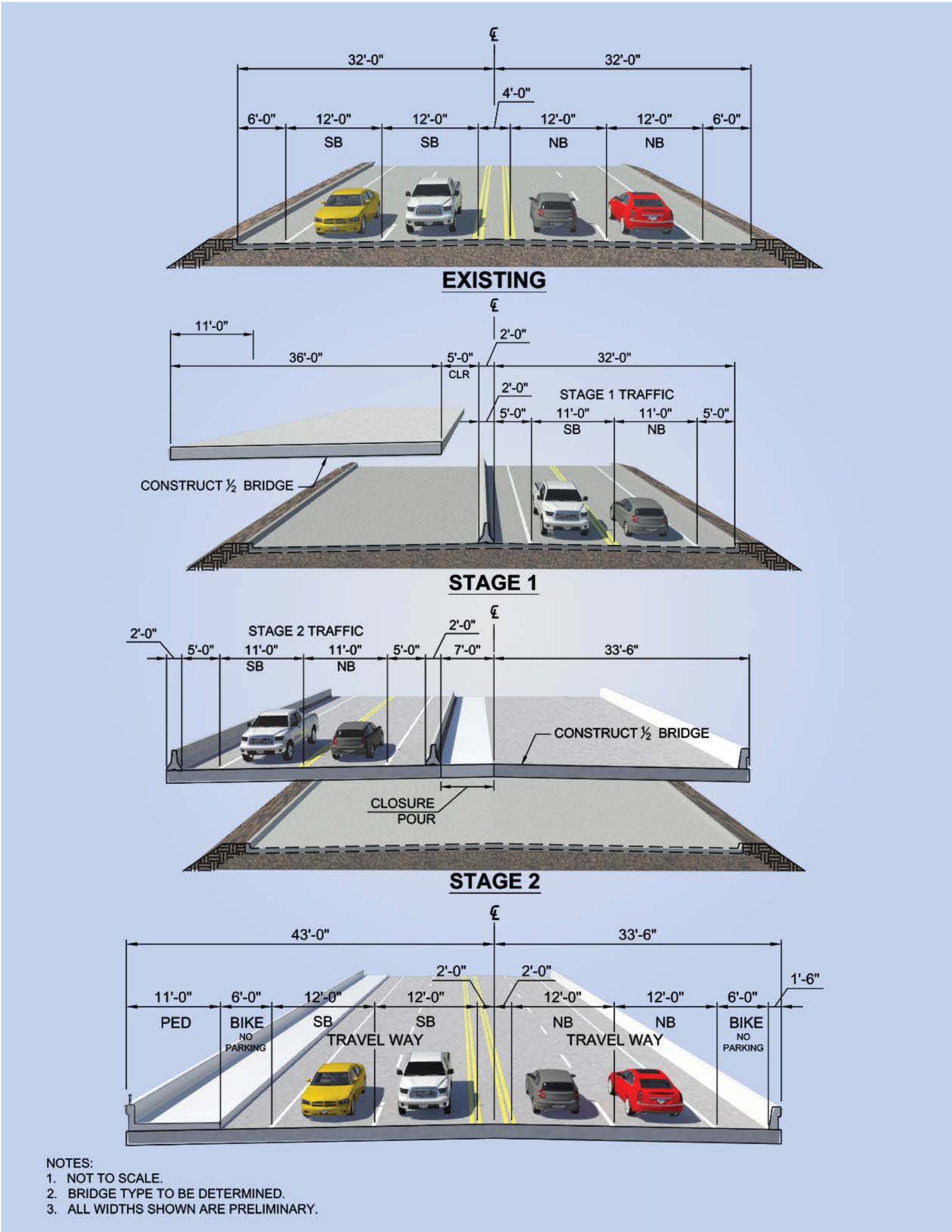
[1] The 200-foot-wide channel would be located south of the current channel. A new bridge on Coast Highway 101 would be necessary. The existing channel would not be maintained and would eventually close naturally. The existing Coast Highway 101 bridge would remain.
NGVD = National Geodetic Vertical Datum
Source: M&N 2012

In particular, Alternative 2A would require a new Coast Highway 101 bridge at the new inlet location farther south. The existing Coast Highway 101 is shown in Figure 2-4 with the proposed bridge and roadway improvements. The proposed cross sections for Coast Highway 101 are shown in Figure 2-5. The new bridge would not increase vehicular capacity along Coast Highway 101 but it would include a separated pedestrian walkway and Class 2 bike lane on the west side of the structure to ensure north-south pedestrian and bicycle access. To raise the roadbed to span the proposed inlet at the required bridge height, a bridge approach would be required extending both north and south of the actual proposed bridge structure. The approach would begin approximately 650 feet north of the proposed bridge near the stop light south of Restaurant Row and would extend approximately 360 feet south of the 285-foot-long bridge structure.

Alternative 2A would also deepen the channels under these longer bridges and armor the slopes at the bridge base with rock.

Some level of shoaling inside the new inlet is anticipated due to sand entrainment from the littoral zone. That sand material would be captured in the sediment basin east of the railroad tracks and removed via routine maintenance. The nearshore zone off San Elijo Lagoon contains a high volume of cobbles. These cobbles are more difficult to remove than sand during maintenance activities; therefore, the proposed new inlet would minimize cobble migration into the lagoon through the use of CBFs. Cobble can be blocked from entering an inlet more effectively than sand because it comprises a smaller volume of material than sand. It also typically "hugs" the shore and forms a deposit below the summer beach profile that becomes exposed in winter. The CBFs would be two relatively short, low rock features along the outer reach of the tidal inlet channel, smaller in scale than jetties. Figure 2-6 shows the CBF concept plan view.

Figure 2-4
Existing Coast Highway 101 and Proposed Improvements

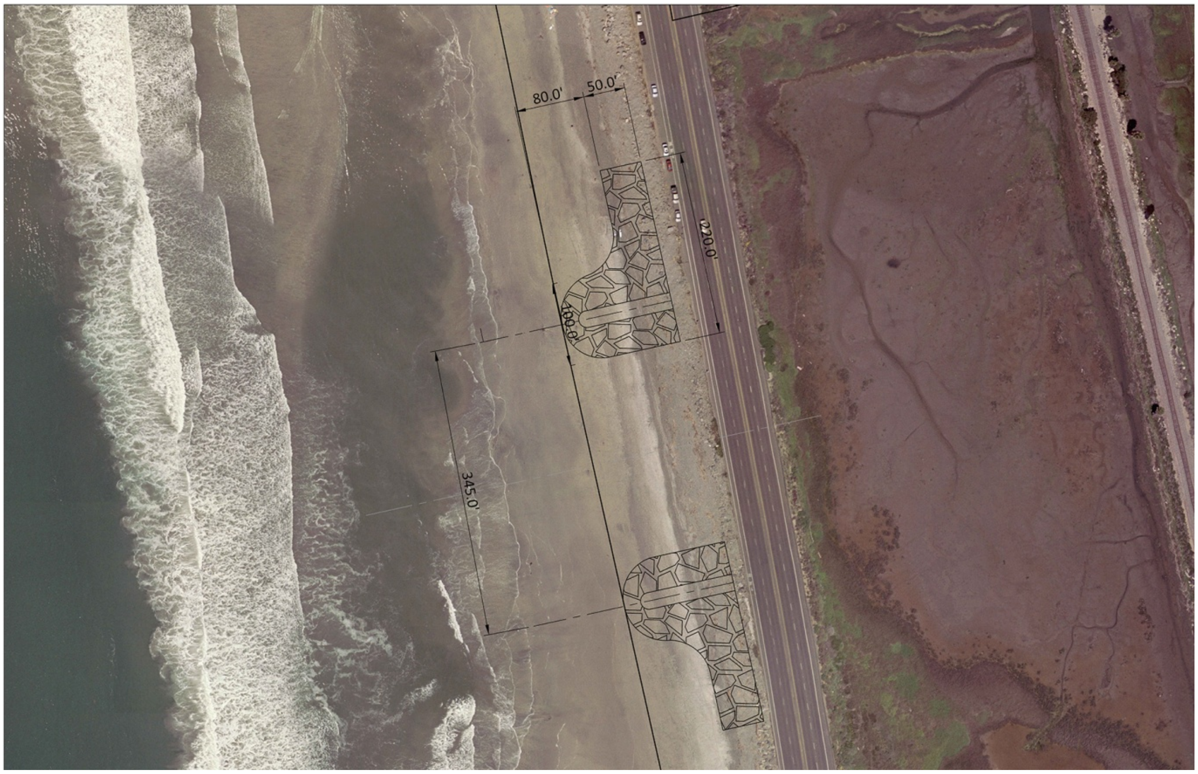


Source: Moffat & Nichol

NO SCALE

Figure 2-5
Highway 101 Existing and Future Cross Sections

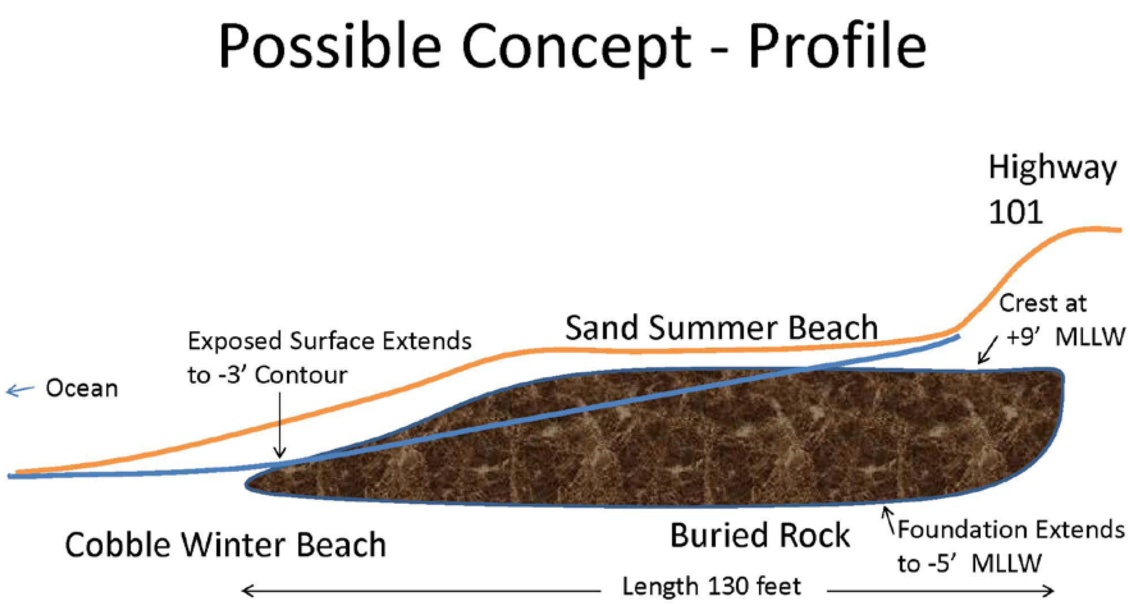
Figure 2-6
CBF Concept Plan View



The CBFs at San Elijo lagoon would be attached to the proposed Coast Highway 101 bridge abutments and extend seaward (perpendicularly) approximately 130 feet to the -5-foot mean lower low water (MLLW) contour on the beach. The CBFs would be approximately 100 feet wide at the seaward edge and extend laterally along the highway bridge approach for a distance of approximately 220 feet. These features would be constructed of riprap large enough to be stable during extreme storm wave events. The exposed "face" of the CBFs along the inside bank of the tidal inlet channel could be treated to look like natural bedrock, sandstone, or other sedimentary features, similar to the treatment on the seawall at south Cardiff State Beach shown in Figure 2-7. The CBFs are anticipated to be slightly visible above the beach profile (approximately 1 foot exposed) in winter and then naturally buried by sand in summer, as shown in Figure 2-8.

Figure 2-7
Example of Naturalized Bedrock Faux Finish on a Coastal Structure

Figure 2-8
Cobble Blocking Feature Concept Profile



2.4.3 Materials Removal and Periodic Maintenance

Alternative 2A would involve overexcavation of the proposed sedimentation basin (to create an overdredge pit) so that poor-quality (e.g., fine-grained) material could be buried in the pit and covered with a sand cap. The good-quality (e.g., larger-grained) material from the overdredge pit in the central basin would then be available for beneficial reuse off-site, as approved by the Corps and EPA. A SAP has been prepared for the SELRP (Appendix A). Additional materials testing in accordance with the ITM may be conducted prior to Corps and EPA approval of the Final SAP Results Report and proposed reuse sites. The SAP indicates that materials excavated from the overdredge pit location (below approximately 2–3 feet below ground surface [bgs]) are likely suitable for placement on beaches or in the nearshore based on physical properties related to grain size. These materials consist, on average, of 10 percent fines and are classified as sand. The age of this sediment layer suggests it has been removed from modern sources of pollution. It is anticipated that approximately 1.4 mcy of material would be exported for reuse for the initial implementation of Alternative 2A. Approximately 500,000 cubic yards (cy) of this sand material from the overdredge pit would be placed in the nearshore off the proposed inlet location of which approximately 200,000 cy would be used to prefill the anticipated ebb bar that would form off the inlet. Table 2-8 identifies volumes that are proposed to be excavated from each basin for placement back into the overdredge pit under the proposed project. A portion of the sand dredged from the west basin (approximately 35,000 cy) would be used to fill the eastern half of the former sewage pond up to an elevation of +13 feet NGVD to create a 2-acre nesting site.

The frequency and anticipated volumes associated with maintenance dredging in the lagoon are also identified in Table 2-8. Maintenance dredging for Alternative 2A would occur within the subtidal basin that would be created in the west and central lagoon basins, shown in Figure 2-12 as “Routine Inlet Maintenance.” Approximately 300,000 cy is anticipated to be dredged from the basin every 3 to 4 years, and the material is planned for placement on Cardiff Beach south of the tidal inlet. Maintenance dredging is anticipated to require approximately 5 months to complete.

Other activities associated with long-term maintenance and adaptive management activities are discussed in Section 2.11.

Table 2-8
Alternative 2A – Materials Removal and Periodic Maintenance

	Alternative 2A
Initial Amount of Material Removed – Total	1.4 million cubic yards
Coastal Area	*50,000 cubic yards*
West Basin	*200,000 cubic yards*
Central Basin	*400,000 cubic yards*
East Basin	*750,000 cubic yards*
Estimated Post-construction Periodic Volume Dredged	300,000 cubic yards
Estimated Post-construction Periodic Maintenance Frequency	Every 3 to 4 years

Source: Nordby and M&N 2012

2.5 ALTERNATIVE 1B – HABITAT DIVERSITY ALTERNATIVE

Alternative 1B would create a more connected gradient of balanced habitat types relative to existing conditions through modifications to channels and habitat areas within the lagoon (Figure 2-9). The existing tidal inlet would remain and no CBFs would be required. The existing Coast Highway 101 bridge structure would be armored against ongoing scour. In addition, the bridge would be seismically retrofitted by others. The main tidal channel would be extended and a mix of mudflats and secondary channels created south of the main channel in the central basin. Existing emergent low-marsh would be retained to the extent possible to create a connected gradient of balanced habitat types in the basin. Retention of emergent low-marsh would be balanced with the need to remove high-nutrient sediments that currently cause water quality issues, such as eutrophication, in the lagoon. The main channel would be redirected just west of I-5 and extended farther into the east basin. The channel in the east basin would be substantially enlarged and the CDFW dike and weir would be removed; combined, this would promote more tidal exchange east of I-5. The tidal prism of Alternative 1B would be substantially increased compared to existing conditions. Nontidal habitat areas would still exist in the east basin, although with the passage of time, natural habitat conversion may occur due to proposed changes in inundation frequencies as tidal influence is extended. Several areas of man-made transitional habitat above tidal elevations would be created in the central basin to supplement the natural transitional habitat that extends around the perimeter of the lagoon. These transitional habitat areas would also offer refugia for sea level rise.

2.5.1 HABITAT DISTRIBUTION

A proposed habitat distribution plan was developed for Alternative 1B to provide a connected gradient of balanced habitat types that remains relatively stable through time, assuming consistent maintenance as described in Section 2.11. Table 2-9 identifies the habitat distribution projected under Alternative 1B.

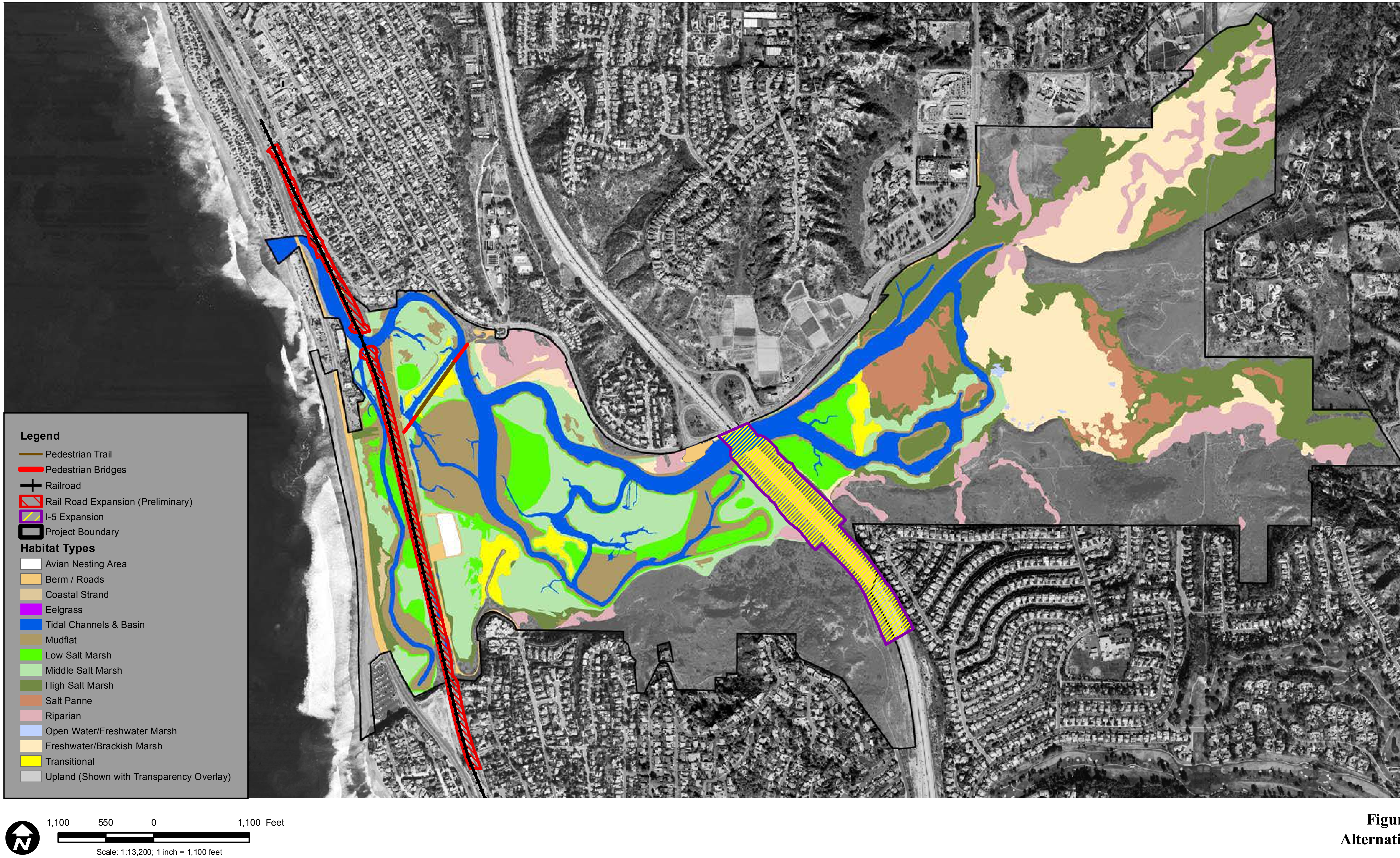


Figure 2-9
Alternative 1B

Path: P:\2008\08080046 San Elijo Lagoon Gap Analysis\5GIS\MXD\Alternatives_Development_Report\alt2a.ai dbrady 1/21/14

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Table 2-9
Alternative 1B Habitat Distribution

Habitat Type	Habitat Distribution (acres)		Habitat Type	Habitat Distribution (acres)	
	Existing[1]	Proposed		Existing[1]	Proposed
Avian Nesting Areas	0	2	Open Water/Tidal Channels and Basins	40	67
Mudflat	63[2]	71	Riparian	72	67
Low-Marsh	13	51	Coastal Strand	5	5
Mid-Marsh	141	98	Upland & Others	299	295
High-Marsh	120	124	Beach	15	15
Salt Panne	37	30	Berms and Roads	23	24
Freshwater/Brackish Marsh	132	99	Transitional (man-made)	0	12

[1] Existing habitat acreages are from 2012 mapping efforts and reflect habitat distributions at that time.
[2] Current functioning mudflat is an artifact of past freshwater impoundment and is converting to low- and mid-marsh because it is not at a natural elevation for self-sustainable mudflat.
Source: Nordby and M&N 2012

Alternative 1B would result in an increase in open water/tidal channels, low-marsh, mudflat, and man-made transitional habitat compared to existing conditions. Proposed low-marsh acreage under this alternative reflects the predicted increase in emergent low-marsh that would occur. Most of the increase in open water/tidal channels and mudflat habitat would occur in the central and east basins, and would result in a corresponding decrease in mid-marsh, salt panne, and freshwater/brackish marsh habitats. Soils within proposed mudflat areas would be native soils lowered slightly in elevation or soils slurried from shallow excavation of the lagoon basins and placed on top of the sand cap on the overdredge pit in the central basin. In both cases, the exposed mudflat soils would consist of native marsh soils that contain native infauna that would serve as seed for a diverse benthic assemblage. The open freshwater ponds currently maintained by the CDFW weir would be converted to open water/tidal channels and low-marsh habitat.

This alternative includes the creation of 15 acres of man-made transitional habitat in both the east and central basins. In addition to man-made transitional habitat, the modified hydrology resulting from grading and the opening of the CDFW dike would result in expanding the natural transition zone throughout the site. This natural (passive) transition area begins at the high-tide line and continues up an additional 2+ feet in elevation. Similar to Alternative 2A, Alternative 1B would fill a former sewage settling pond in the central basin and cap it with 2 feet of sand topped with crushed shell to enhance opportunities for California least tern nesting. Additional features may be incorporated into the nesting area through consultation with state and federal wildlife agencies, such as sculpting, provision of signs deterring access topped with anti-perch devices to reduce the potential for perching diurnal and nocturnal raptors, details for substrate requirements and coloration, evaluation of fencing, and direct continuity to nonvegetated mudflats (where possible).

2.5.2 CHANNEL AND INFRASTRUCTURE IMPROVEMENTS

Alternative 1B would require bridge improvements at the I-5 crossing, as planned by Caltrans, to lengthen the channel opening (Table 2-10). The channel would also be deepened below the new bridge as illustrated by the negative invert measurement in Table 2-10. The existing bridges at Coast Highway 101 and the NCTD railroad would remain in place, although the channels underneath would require deepening for improved hydraulics. The existing Coast Highway 101 bridge structure would be retrofitted to current seismic standards by others, with no changes to the roadway alignment proposed. Rock armoring would be installed at all three features to provide channel bank and bridge abutment protection and prevent undermining by increased tidal/fluvial flows (M&N 2012).

Table 2-10
Alternative 1B Inlet and Channel Dimensions

	Coast Highway 101/Inlet		Railroad Trestle		I-5 Bridge	
	Bottom Width (feet)	Invert (feet, NGVD)	Bottom Width (feet)	Invert (feet, NGVD)	Bottom Width (feet)	Invert (feet, NGVD)
Existing	105	-0.87	187	-0.87	130	0.74
Alternative 1B	130	-4	187	-5.5	261	-6

NGVD = National Geodetic Vertical Datum
Source: M&N 2012

2.5.3 MATERIALS REMOVAL AND PERIODIC MAINTENANCE

Alternative 1B would involve creation of an overdredge pit to provide material suitable for reuse within the littoral zone. A SAP has been prepared for the SELRP (Appendix A). Additional materials testing in accordance with the ITM may prior to Corps and EPA approval of the Final SAP Results Report and proposed disposal/reuse sites. The SAP (Appendix A) indicates that materials excavated from the overdredge pit location (below approximately 2–3 feet bgs) are likely suitable for placement on beaches or in the nearshore based on physical properties related to grain size. These materials consist, on average, of 10 percent fines and are classified as sand. The age of this sediment layer suggests it has been removed from modern sources of pollution. It is anticipated that approximately 1.2 mcy of material would be exported from the overdredge pit in the central basin for reuse for the initial implementation of Alternative 1B. Table 2-11 identifies volumes that would then be excavated from each basin and placed in the overdredge pit under this alternative. Alternative 1B would fill the former sewage settling pond in the central basin and cap it with sand for use as a nesting site.

Inlet maintenance would also require the removal of approximately 40,000 cy annually, utilizing the same land-based approach and occurring in the same location as existing inlet management (Table 2-11). Maintenance would extend from Highway 101 to the channel curve just downstream of the railroad bridge. That maintenance is anticipated to occur in April and require approximately 4 weeks. Activities associated with long-term maintenance and adaptive management are discussed in Section 2.11.

Table 2-11
Alternative 1B Materials Removal and Periodic Maintenance

	Alternative 1B
Initial Amount of Material Removed	1.2 million cubic yards
Coastal Area	*0 cubic yards*
West Basin	*50,000 cubic yards*
Central Basin	*400,000 cubic yards*
East Basin	*750,000 cubic yards*
Estimated Post-construction Periodic Volume Removed	40,000 cubic yards
Estimated Post-construction Periodic Maintenance Frequency	Annually

Source: Nordby and M&N 2012

2.6 ALTERNATIVE 1A – INTERTIDAL ALTERNATIVE

Alternative 1A would implement the least physical changes to the site. The main feeder channel throughout the site would be enlarged and redirected just west of I-5 (Figure 2-10). The main tidal channel would be extended farther into the east basin, and existing constricted channel connections would be cleared and enlarged. The existing CDFW dike would be left in place, but two new channels would be created through it to allow tidal and fluvial connections. The tidal prism of Alternative 1A would be slightly increased compared to existing conditions. Existing habitat areas would essentially remain intact, although current conversion trends from unvegetated intertidal habitats to vegetated intertidal habitats would be expected to continue. High-nutrient sediment removal would primarily be limited to the main channel. Some freshwater habitat areas in the east basin are anticipated to convert to more saltwater-based communities due to enhanced tidal influence and the resulting changes in inundation frequencies. One small area of transitional habitat (refugia above tidal elevations) would be constructed in the northwest portion of the central basin.

2.6.1 HABITAT DISTRIBUTION

The proposed habitat distribution for Alternative 1A from dredging and grading activities is summarized in Table 2-12. This assumes consistent maintenance, as described in Section 2.11.

Table 2-12
Alternative 1A Proposed Habitat Distribution

Habitat Type	Habitat Distribution (acres)		Habitat Type	Habitat Distribution (acres)	
	Existing[1]	Proposed		Existing[1]	Proposed
Avian Nesting Areas	0	2	Open Water/Tidal Channels and Basins	40	34
Mudflat	63[2]	25	Riparian	72	70
Low-Marsh	13	44	Coastal Strand	5	5
Mid-Marsh	141	140	Upland & Others	299	299
High-Marsh	120	145	Beach	15	15
Salt Panne	37	35	Berms and Roads	23	24
Freshwater/Brackish Marsh	132	121	Transitional (man-made)	0	2

[1] Existing habitat acreages are from 2012 mapping efforts and reflect habitat distributions at that time.
[2] Current functioning mudflat is an artifact of past freshwater impoundment and is converting to low- and mid-marsh because it is not at a natural elevation for self-sustainable mudflat.
Source: Nordby and M&N 2012

Alternative 1A habitat distribution would result in a high proportion of mid- and high-marsh habitat. There would be a decrease of mudflat, open water/tidal channels, and freshwater/brackish marsh and an increase of low-marsh and high-marsh habitat compared to existing conditions. This alternative allows the continued conversion of mudflats to low-marsh and some existing freshwater marsh would be converted to high-marsh and open water/tidal channel habitat. Currently, there is a shortage of subtidal channels to convey sea water and an abundance of freshwater/brackish marsh.

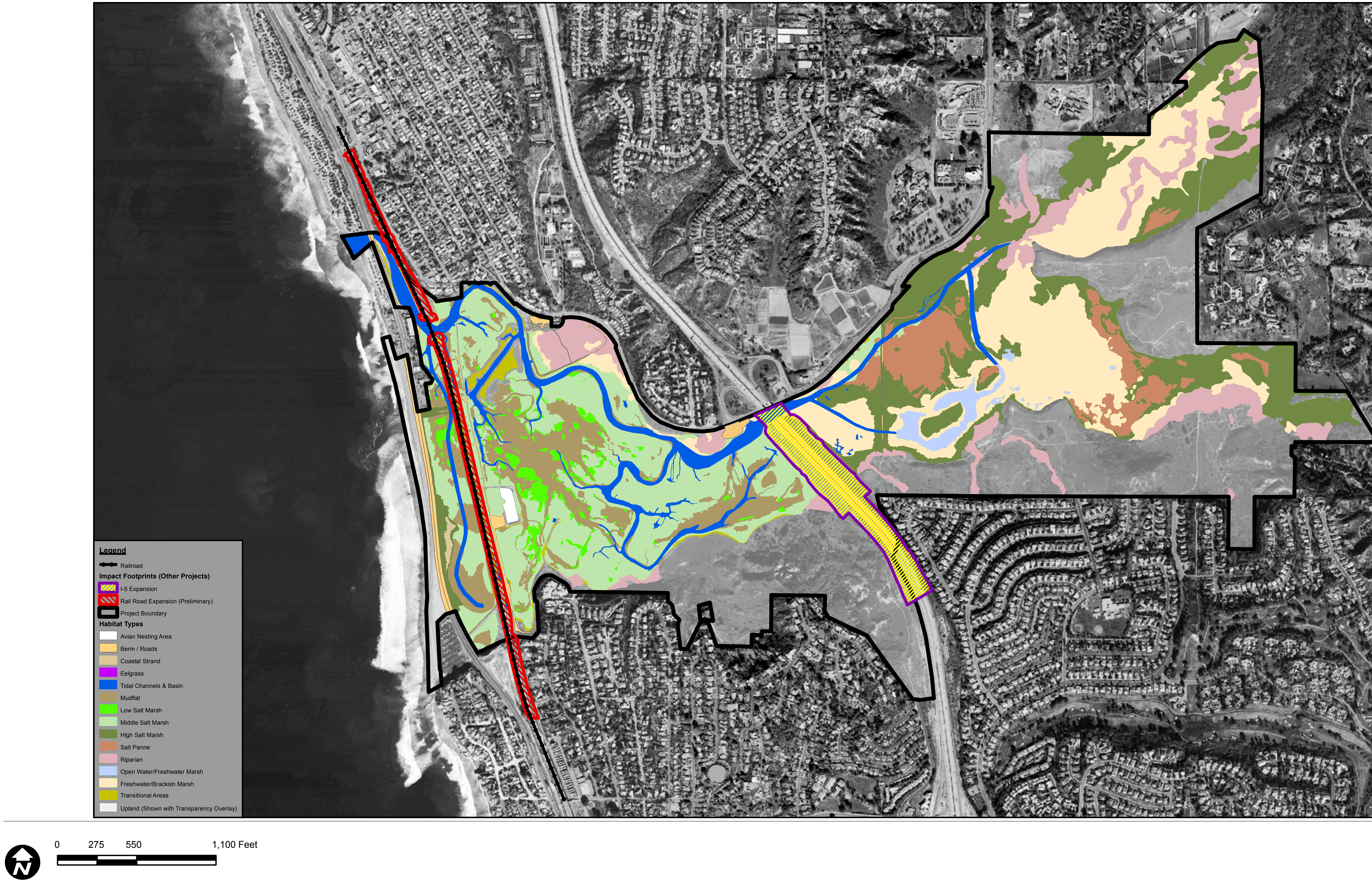

Figure 2-10
Alternative 1A

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Approximately 2 acres of man-made transitional habitat would be created in the northern portion of the central basin. In addition to man-made transitional habitat, the modified hydrology resulting from grading and the opening of the CDFW dike would result in the expansion of the natural transition zone throughout the site. This natural (passive) transition area begins at the high-tide line and continues up an additional 2+ feet in elevation. Like the other two alternatives, Alternative 1A would fill a former sewage settling pond in the central basin and cap it with 2 feet of sand topped with crushed shell to enhance opportunities for California least tern nesting. Additional features may be incorporated into the nesting area through consultation with state and federal wildlife agencies, such as additional sculpting, provision of signs deterring access topped with anti-perch devices to reduce the potential for perching diurnal and nocturnal raptors, details for substrate requirements and coloration, evaluation of fencing, and direct continuity to nonvegetated mudflats (where possible). Salt panne habitat in the east basin could support avian nesting.

2.6.2 Channel and Infrastructure Improvements

Alternative 1A would not require infrastructure improvements at I-5 or the railroad bridge, but the channels under those features would be deepened for improved hydraulics (Table 2-13). The channel under Coast Highway 101 would also be widened slightly, but replacement of the bridge structure would not be necessary. The existing Coast Highway 101 bridge would be retained and retrofitted by others to meet current seismic safety standards. No changes to the existing roadway alignment are proposed. All three features would be armored to prevent undermining (Table 2-5). The existing CDFW weir would remain in place, but two gaps would be created to improve tidal connection with the east portion of the basin. It is possible NCTD or Caltrans would implement bridge improvements for their projects even if this restoration alternative is implemented. Channel improvements would increase channels to at least the depth and widths shown in Table 2-13, unless those projects also include channel work. If additional improvements occur to the channels, the alternative as analyzed in this document would not be substantially affected.

Table 2-13
Alternative 1A Inlet and Channel Dimensions

	Coast Highway 101/Inlet		Railroad Trestle		I-5 Bridge	
	Bottom Width (feet)	Invert (feet, NGVD)	Bottom Width (feet)	Invert (feet, NGVD)	Bottom Width (feet)	Invert (feet, NGVD)
Existing	105	-0.87	187	-0.87	130	0.74
Alternative 1A	115	-4	187	-5.5	130	-6

NGVD = National Geodetic Vertical Datum
Source: M&N 2012

2.6.3 MATERIALS REMOVAL AND PERIODIC MAINTENANCE

Approximately 160,000 cy of material is proposed to be exported to LA-5 for the implementation of Alternative 1A, with the majority in the west and central basins (Table 2-14). This would primarily be material from existing channels as they are deepened and widened to improve tidal movement. That material would not be suitable for reuse as beach or littoral cell nourishment because of the relatively fine grain size. Given the relatively modest amount of material and because there is no large area proposed for disturbance that could accommodate an overdredge pit in the central basin, no overexcavation would occur in this scenario.

Additionally, this alternative would not remove much of the high-nutrient sediments currently causing eutrophic conditions in the lagoon. Alternative 1A would utilize some material removed from the site to fill the former sewage settling pond in the central basin (approximately 35,000 cy) and cap it with sand for use as a nesting site, but additional material would be exported for disposal.

LA-5 is one of 12 existing EPA-designated ocean disposal sites for dredged material in Region 9. Each site is managed according to a Site Management and Monitoring Plan. Preliminary coordination with the Corps and EPA indicates that the material appears suitable for disposal at LA-5. If Alternative 1A is selected for implementation, additional Tier 3 testing in accordance with ODM and coordination would be conducted prior to authorization for disposal at the site. Should the materials be determined not suitable for disposal at this location, the material would be sequestered on-site in built transitional or nesting areas in the same location and method as described for Alternative 1B. Inlet maintenance would use the same land-based approach and would occur in the same area as existing management, would require approximately 2 weeks, and would generate sand suitable for placement within the littoral zone, either on the beach or in the nearshore. Maintenance would extend from Highway 101 to the channel curve just downstream of the railroad bridge. The sand quantity removed would be approximately 35,000 cy per year for Alternative 1A and would be anticipated to occur in April. Activities associated with long-term maintenance and adaptive management are discussed in Section 2.11.

Table 2-14
Alternative 1A Materials Removal and Periodic Maintenance

	Alternative 1A
Initial Amount of Material Removed	160,000 cubic yards
Coastal Area	*0 cubic yards*
West Basin	*50,000 cubic yards*
Central Basin	*75,000 cubic yards*
East Basin	*35,000 cubic yards*
Estimated Post-construction Periodic Volume Removed	35,000 cubic yards
Estimated Post-construction Periodic Maintenance Frequency	Annually

Source: Nordby and M&N 2012

2.7 NO PROJECT/NO FEDERAL ACTION ALTERNATIVE

CEQA requires analysis of a No Project alternative in which the proposed project would not occur. Evaluation required under NEPA of the No Federal Action alternative evaluates the possibility of no federal permit issuance, but allows for some components of the project outside federal jurisdiction to be implemented. Because the SELRP is water dependent and cannot be implemented outside of Corps jurisdictional waters, the NEPA scope of analysis includes the complete restoration project as proposed within this EIR/EIS. No components of the project could be implemented without approval of the Corps; therefore, the No Project/No Federal Action Alternative is evaluated as a single alternative in this document. Under this alternative, there would be no dredging or excavation to improve water quality or tidal circulation, channel clearing, or other comprehensive actions to improve tidal exchange or conveyance of freshwater in high flow conditions. The lagoon inlet would remain in its existing location. Currently, management of the lagoon involves mechanical excavation to maintain an open inlet condition, as funding allows. This is assumed to continue into the future. The present spectrum of environmental constraints would continue to limit the quality and productivity of the lagoon. Under the No Project/No Federal Action Alternative, conversion from subtidal and mudflat to a system dominated by saltmarsh and riparian habitat would continue. This conversion would continue to occur fairly rapidly. Water quality impairments due to nutrient-rich sediments and limited circulation would also continue to occur.

2.7.1 HABITAT DISTRIBUTION

Historically, high water elevations resulting from frequent mouth closures and water impoundment in the lagoon have resulted in mudflat and open water/tidal channels habitats. Over the last decade, active management of an open lagoon mouth has been implemented, which has resulted in rapid habitat conversion. Specifically, the existing mudflat is converting to low-marsh habitat and portions of mid-marsh are anticipated to convert to high-marsh. The rapid conversion of mudflat was observed between 2010 and 2012, with a gain of 13 acres of low-marsh (cordgrass dominated) habitat and a direct loss of mudflat. Ultimately, the conversion of another 34 acres of mudflat is anticipated as the lagoon moves toward a state of equilibrium with current water levels and inundation frequencies. This conversion is anticipated to occur within 5–10 years if current rates continue.

The practice of active management at the lagoon mouth is expected to continue under this alternative to maintain consistent tidal exchange with the ocean and allow fluvial flows to exit the lagoon. This exchange, although limited by the existing hydraulic constraints in the lagoon, maintains more acceptable water quality levels in the lagoon. When the inlet closes to tidal flushing, depending on seasonal conditions, the lagoon water quality rapidly deteriorates due to the nutrient load stored in the existing sediments and the impoundment of freshwater from the watershed.

Therefore, under this alternative, open water/tidal channels would continue to decrease as would mudflats and mid-saltmarsh habitat (Table 2-15). Low- and high-saltmarsh habitat would continue to increase. Currently, no tidally influenced high-saltmarsh is on the site as the existing high-saltmarsh is located upstream of the current extent of tidal influence due to historic water impoundment behind the CDFW dike. Maintaining existing tidal influence would increase tidally influenced high-marsh and preserve brackish and freshwater high-marsh.

Table 2-15
No Project/No Federal Action Alternative Habitat Distribution

Habitat Type	Habitat Distribution (acres)			Habitat Type	Habitat Distribution (acres)		
	Existing[1]	Predicted[3]	Change		Existing[1]	Predicted[3]	Change
Avian Nesting Areas	0	0	0	Open Water/Tidal Channels and Basins	40	24	-16
Mudflat	63[2]	29	-34	Riparian	72	71	-1
Low-Marsh	13	51	+38	Coastal Strand	5	5	0
Mid-Marsh	141	107	-34	Upland & Others	299	299	0
High-Marsh	120	167	+47	Beach	15	15	0
Salt Panne	37	37	0	Berms and Roads	23	23	0
Freshwater/Brackish Marsh	132	131	-1	Transitional (man-made)	0	0	0

[1] Existing habitat acreages are from 2012 mapping efforts and reflect habitat distributions at that time.
[2] Current functioning mudflat is an artifact of past freshwater impoundment and is converting to low- and mid-marsh because it is not at a natural elevation for self-sustainable mudflat. The decrease in mudflat reflects the remaining mudflat after predicted conversion has occurred.
[3] Under the No Project/No Federal Action Alternative, current habitat conversion would continue until equilibrium is reached. Equilibrium is expected to occur within 5–10 years if existing conversion rates continue.
Source: Nordby and M&N 2012

The No Project/No Federal Action Alternative would not maximize the opportunity to implement a comprehensive restoration project for the entire lagoon. However, any one of the management/owner entities (SELC, CDFW, and/or County) may incrementally implement restoration, enhancement, and creation projects on a smaller scale through the use of other funding sources. These smaller efforts would require a separate CEQA/NEPA and permit process. If lagoon conditions persist and no restoration is initiated, lagoon habitat would continue to convert, resulting in the loss of mudflat and the increase of low- and high-marsh in the central basin. As noted above, current functioning mudflat is an artifact of past freshwater impoundment and is not at a natural elevation for a self-sustaining mudflat. The decrease in mudflat for this alternative reflects remaining mudflat in the equilibrium condition (after predicted conversion has occurred). In addition, mid-marsh habitat would convert to high-marsh habitat and there would be a loss of open water habitat throughout the lagoon compared to existing conditions. While allowing the lagoon to revert to a more frequently closed-inlet condition could slow or halt this conversion, water quality would then be expected to deteriorate and result in extended eutrophic conditions.

2.7.2 Channel and Infrastructure Improvements

Under the No Project/No Federal Action Alternative, no changes to existing channels within the lagoon would occur as part of this project (i.e., widening or deepening to improve hydraulics). Infrastructure improvements to the NCTD railroad and I-5 could continue to move forward independently, as described in Table 2-5. Seismic improvements to Coast Highway 101 may occur in the future; however, those improvements would not be completed under a lagoon restoration program.

2.7.3 Materials Removal and Periodic Maintenance

Under the No Project/No Federal Action Alternative, no materials would be dredged from the lagoon for the purpose of restoration. However, the existing inlet would continue to be opened annually, with excavated material deposited on the beach near the mouth. Based on the continuation of current efforts, the frequency and anticipated volumes associated with inlet maintenance in the lagoon under the No Project/No Federal Action Alternative are identified in Table 2-16. No other programmatic long-term maintenance or adaptive management activities would occur.

Table 2-16
No Project/No Federal Action Alternative Materials Removal and Periodic Maintenance

	No Project/No Federal Action Alternative
Initial Amount of Material Removed	0 cubic yards
Estimated Periodic Volume Removed	25,000 cubic yards
Estimated Periodic Maintenance Frequency	Annually

Source: Nordby and M&N 2012

2.8 COMPARISON OF ALTERNATIVE CHARACTERISTICS

It is informative to compare the various characteristics of each alternative to each other to see the relative differences. Table 2-17 provides a comparison of the habitat distribution for the proposed project and alternatives. Table 2-18 provides a comparison of the inlet and channel dimensions for the proposed project and alternatives. Table 2-19 provides a comparison of the materials removal and periodic maintenance requirements.

Table 2-17
Habitat Distribution Comparison for the Project Alternatives

Habitat Type	Habitat Distribution (acres)[1]							No Project/ No Federal Action	
	Existing	Proposed Distribution (and net acreage change)[2]							
		Alternative 2A		Alternative 1B		Alternative 1A			
Avian Nesting Areas	0	2 (+2)		2 (+2)		2 (+2)		0 (0)	
Mudflat	63	102 (+39)		71 (+8)		25 (-38)		29 (-34)	
Low-Marsh	13	23 (+10)		51 (+38)		44 (+31)		51 (+38)	
Mid-Marsh	141	124 (-17)		98 (-43)		140 (-1)		107 (-34)	
High-Marsh	120	107 (-13)		124 (+4)		145 (+25)		167 (+47)	
Salt Panne	37	17 (-20)		30 (-7)		35 (-2)		37 (0)	
Freshwater/Brackish Marsh	132	96 (-36)		99 (-33)		121 (-11)		131 (-1)	
Open Water/Tidal Channels and Basins	40	74 (+34)		67 (+27)		34 (-6)		24 (-16)	
Riparian	72	67 (-5)		67 (-5)		70 (-2)		71 (-1)	
Coastal Strand	5	5 (0)		5 (0)		5 (0)		5 (0)	
Upland & Others	299	292 (-7)		295 (-4)		299 (0)		299 (0)	
Beach	15	14 (-1)		15 (0)		15 (0)		15 (0)	
Berms and Roads	23	24 (+1)		24 (+1)		24 (+1)		23 (0)	
Transitional (man-made)	0	12 (+12)		12 (+12)		2 (+2)		0 (0)	
Total[3]	**960**	**960**	0	**960**	0	**960**	0	**960**	0

[1] Existing habitat acreages are from 2012 mapping efforts and reflect habitat distributions at that time.
[2] The proposed habitat distribution acreages represent the proposed immediate post-project condition that would result from the implementation of each alternative, and do not take into account future sea level rise.
[3] Totals may not add due to rounding.
Source: Nordby and M&N 2013

Table 2-18
Inlet and Channel Dimensions Comparison for the Project Alternatives

	Coast Highway 101/Inlet		NCTD Railroad Trestle		I-5 Bridge	
	Bottom Width (feet)	Invert (feet, NGVD)	Bottom Width (feet)	Invert (feet, NGVD)	Bottom Width (feet)	Invert (feet, NGVD)
Existing	105	-0.87	187	-0.87	130	0.74
Alternative 2A	200	-6.5	590	-7	261	-6.5
Alternative 1B	130	-4.0	187	-5.5	261	-6.0
Alternative 1A	115	-4.0	187	-5.5	130	-6.0
No Project/ No Federal Action	105	-0.87	187	-0.87	130	0.74

NGVD = National Geodetic Vertical Datum
Source: M&N 2012

Table 2-19
Materials Removal and Periodic Maintenance Comparison for the Project Alternatives

	Alternative 2A	Alternative 1B	Alternative 1A	No Project/No Federal Action
Initial Amount of Material Removed	1.4 mcy	1.2 mcy	160,000 cy	0
Estimated Post-construction Periodic Volume Removed	300,000 cy	40,000 cy	35,000 cy	25,000 cy
Estimated Post-construction Periodic Maintenance Frequency	Every 3 to 4 years	Annually	Annually	Annually

mcy = million cubic yards
cy = cubic yards

2.9 MATERIALS DISPOSAL

Depending upon the alternative, anywhere from 160,000 cy to 1.4 mcy of excavated or dredged materials would need to be disposed of and/or reused as part of restoration implementation. This is in addition to the vegetative material removed as part of clear and grub activities, which is discussed further in Section 2.10. As discussed in Section 2.2.2, specific locations have been carried forward for potential materials disposal/reuse. A matrix describing each of the materials disposal/reuse scenarios and maximum capacity per site is provided in Table 2-20 and shown in Figures 1-3 and 2-11. Alternative 2A and Alternative 1B have a variety of options. However, under Alternative 1A, material would be relatively fine-grained and is proposed to be disposed of in the offshore disposal site currently designed and permitted for such usage (LA-5).

The materials disposal/reuse scenarios described in Table 2-20 reflect a maximum volume that could be placed at a variety of locations and the total available capacity exceeds the amount of material needed to be disposed/reused for the construction of Alternative 2A or Alternative 1B. Thus, only a portion of these disposal/reuse sites, or a portion of the volume (and footprints) identified in Table 2-20, may actually be used for materials placement under those alternatives. Inlet maintenance would also result in materials to be disposed of, but material removed from the inlet is anticipated to be sandy and disposed of on the adjacent beach/nearshore, and is not taken into account in Table 2-20, which focuses on the one-time 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/EIS. Direct linkage occurs between Alternative 1A and the necessary disposal site. For the other two action alternatives, several options are available. Therefore, the materials disposal/reuse scenarios are evaluated independently throughout the document.

Table 2-20
Proposed Materials Disposal and Beneficial Reuse Scenarios

<table>
<tr><td colspan="5">Approximate Net Quantity of Material:
Alternative 1A = 160,000 cy of relatively poor-quality material that is only suitable for offshore disposal at LA-5
Alternative 1B = 1.2 mcy (overdredging would occur to generate appropriate material for beneficial reuse)
Alternative 2A = 1.4 mcy (overdredging would occur to generate appropriate material for beneficial reuse)</td></tr>
<tr><th rowspan="2">Type of Materials Placement</th><th rowspan="2">Potential Disposal Locations</th><th colspan="3">Maximum Volumes Proposed for Placement by Site</th></tr>
<tr><th colspan="2">Alternative 2A and Alternative 1B (cy)</th><th>Alternative 1A (cy)</th></tr>
<tr><td>Offshore Disposal</td><td>LA-5</td><td colspan="2">0</td><td>160,000</td></tr>
<tr><td>Offshore Stock-piling (outside littoral cell)</td><td>SO-5/SO-6</td><td colspan="2">1,000,000</td><td>0</td></tr>
<tr><td rowspan="2">Nearshore (inside littoral cell)</td><td rowspan="2">Cardiff</td><td>Alternative 2A</td><td>Alternative 1B</td><td rowspan="2">0</td></tr>
<tr><td>500,000</td><td>300,000</td></tr>
<tr><td rowspan="5">Onshore (beach placement)</td><td>Cardiff</td><td colspan="2">300,000</td><td>0</td></tr>
<tr><td>Leucadia</td><td colspan="2">117,000</td><td>0</td></tr>
<tr><td>Moonlight Beach</td><td colspan="2">105,000</td><td>0</td></tr>
<tr><td>Solana Beach</td><td colspan="2">146,000</td><td>0</td></tr>
<tr><td>Torrey Pines</td><td colspan="2">245,000</td><td>0</td></tr>
</table>

Notes:
General – The disposal/placement sites have not yet been approved. The disposal/reuse scenario will be identified once the final SAP is reviewed and approved by the Corps and EPA.

1. Nearshore materials placement quantity at Cardiff is greater in Alternative 2A because a new inlet would require construction of a prefilled ebb bar (Section 2.4).
2. Materials placement quantities exceed amount to be disposed of, or reused, to allow flexibility at individual placement sites.
3. Onshore beach sand placement sites are consistent with the 2012 RBSP (SCH #2010051063) with the exception of Cardiff, which would extend slightly farther north and south along the coastline. Refer to Figure 2-11 for the proposed project's sand placement sites. While 2012 RBSP sites are proposed for use, the SELRP would obtain permits for placement, since the 2012 RBSP was a one-time project implemented in 2012.
4. Capacities for each site are defined differently, as described below:
   - LA-5 is typically limited by the Corps and EPA to receiving 700,000 cy of disposal material per year.

- SO-5 and SO-6 capacities are approximately 1.5 mcy and 400,000 cy, respectively. These capacities represent the volumes removed during previous projects (e.g., 2001 and 2012 RBSPs).
- Onshore and nearshore capacities for Cardiff were defined as volumes modeled that did not predict long-term impacts to sensitive nearshore resources, as discussed in Section 3.6 of this EIR/EIS.
- Onshore placement sites (other than Cardiff) were limited to capacities similar to those included in the previously implemented 2001 and 2012 RBSPs.

5. Sand Compatibility and Opportunistic Use Programs (SCOUP) sites are not included as an option for materials placement in this EIR/EIS because the existing SCOUPs assume construction methods and other conditions that are not consistent with the SELRP (e.g., daytime construction only).

cy = cubic yards
mcy = million cubic yards

2.10 CONSTRUCTION METHODS, SCHEDULE, AND PROJECT DESIGN FEATURES

The SELRP would be constructed over several phases and require unique approaches and equipment. This section provides a description of possible construction methods associated with both the lagoon restoration and materials disposal/reuse components of the proposed project. In addition, potential phasing and scheduling features are identified. Specific project design features that have been incorporated into the project design to minimize or avoid potential effects to resources are also detailed in this section. Construction may be accomplished using various methods; this section of the EIR/EIS presents a conservative scenario for disclosure purposes, but the actual construction approach may be refined during final design and/or in the contractor bid phase.

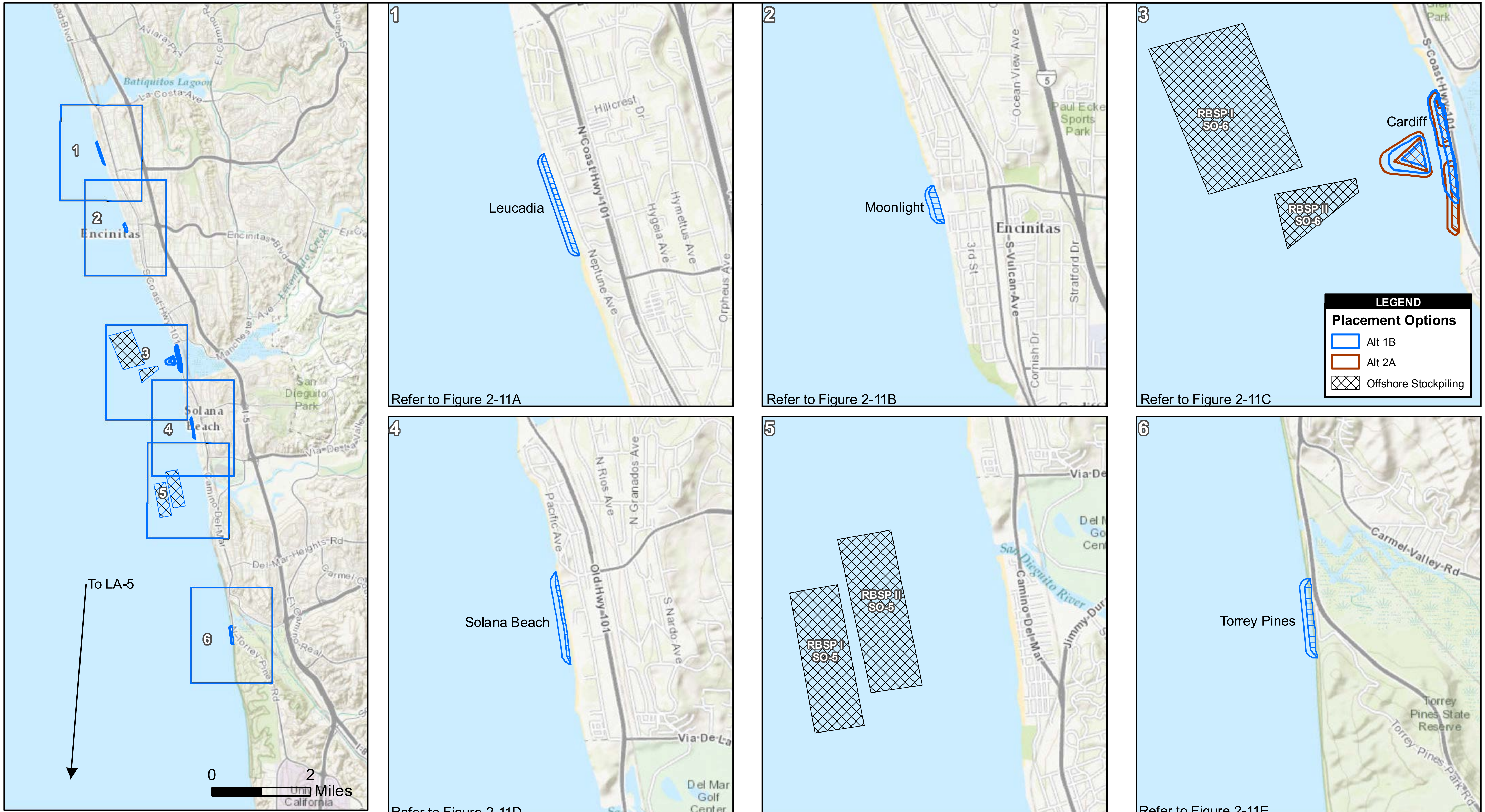
Project construction is assumed to occur concurrently with construction of two other projects at the lagoon to minimize overall environmental impacts and the duration of disturbance within the lagoon, as required by Senate Bill 468 (see Section 1.5). The two projects are the I-5 bridge replacement proposed by Caltrans as part of the I-5 North Coast Corridor Project improvements and the LOSSAN Project proposed by SANDAG. Both of these projects are corridor-wide program planning efforts and are undergoing separate environmental review. Responsibility for the construction of each of these projects is summarized below in Table 2-21 Though independent projects, coordination is ongoing with them to maximize the efficiency and environmental sensitivity of overall construction activities in the lagoon. The I-5 and LOSSAN infrastructure projects will be constructed under a Construction Manager/General Contractor (CM/GC) approach. The CM/GC approach is a contractual mechanism to provide coordination between multiple projects for implementation and inclusion of detailed contract methods is not necessary for the analysis of an environmental document. The CM/GC would address issues such as schedule, phasing, work areas, sharing resources, per the collaboration called for by the Kehoe bill (SB 468). For evaluation purposes, each is considered as a cumulative project in Chapter 5 of this EIR/EIS.

Generally, construction would consist of:

1. Dredging and grading within the lagoon to raise or lower elevations to create a diverse mosaic of habitats that remains resilient through time.
2. Modifications to the existing lagoon inlet to enhance tidal flow in and out of the lagoon, and internal lagoon bathymetric modifications to increase the tidal prism within the lagoon basins and the rate of water transfer between the ocean and lagoon.
3. Infrastructure improvements and protection, as necessary, including bridge retrofitting or construction along Coast Highway 101.
4. Disposal of sediments excavated from the lagoon to different locations, as identified for materials disposal/reuse, including offshore disposal areas, offshore placement sites, nearshore areas, nearby beaches, and/or on-site placement. Two of the project alternatives 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 potentially be beneficially reused in the littoral system.
5. Restoration of graded areas within the lagoon to facilitate recovery of habitat.

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 San Elijo Lagoon. Construction scenarios proposed under each alternative are presented below, along with general information about the timing and duration of anticipated activities. This discussion provides a construction approach for Alternative 2A, and then provides information for Alternative 1B and Alternative 1A, which would generally result in incrementally less effort including duration and/or phasing. Figures 2-12 through 2-14 show potential disturbance limits for each alternative, while Figure 2-15 shows access and staging areas for each of the build alternatives and illustrates the system of dikes that would be constructed to allow flooding of specific areas while retaining refugia in other parts of the lagoon. These dikes are required to control flooding necessary to conduct dredging throughout the lagoon.

Construction is anticipated to start in January 2016, but this schedule may change based on approvals and authorizations needed for project implementation. A period of up to approximately 36 months of active construction is anticipated for project implementation. Work would generally consist of site preparation and mobilization, construction of dikes to contain and limit flooding needed to conduct dredging, flooding of specific basins and areas while dredging occurs, and draining of flooded areas to allow basins to begin recovery and provide refugia while



Source: Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community; SanGIS 2012; MoffattNichol 2012

2,500 1,250 0 2,500 Feet

Scale: 1 = 30,000; 1 inch = 5,000 feet

Figure 2-11
Potential Offsite Materials Placement Sites

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\DisposalOverview.mxd, 7/2/2014, steinb

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Source: SANDAG 2012; MoffattNichol; AECOM 2014

Figure 2-11A
Materials Placement Site
Leucadia

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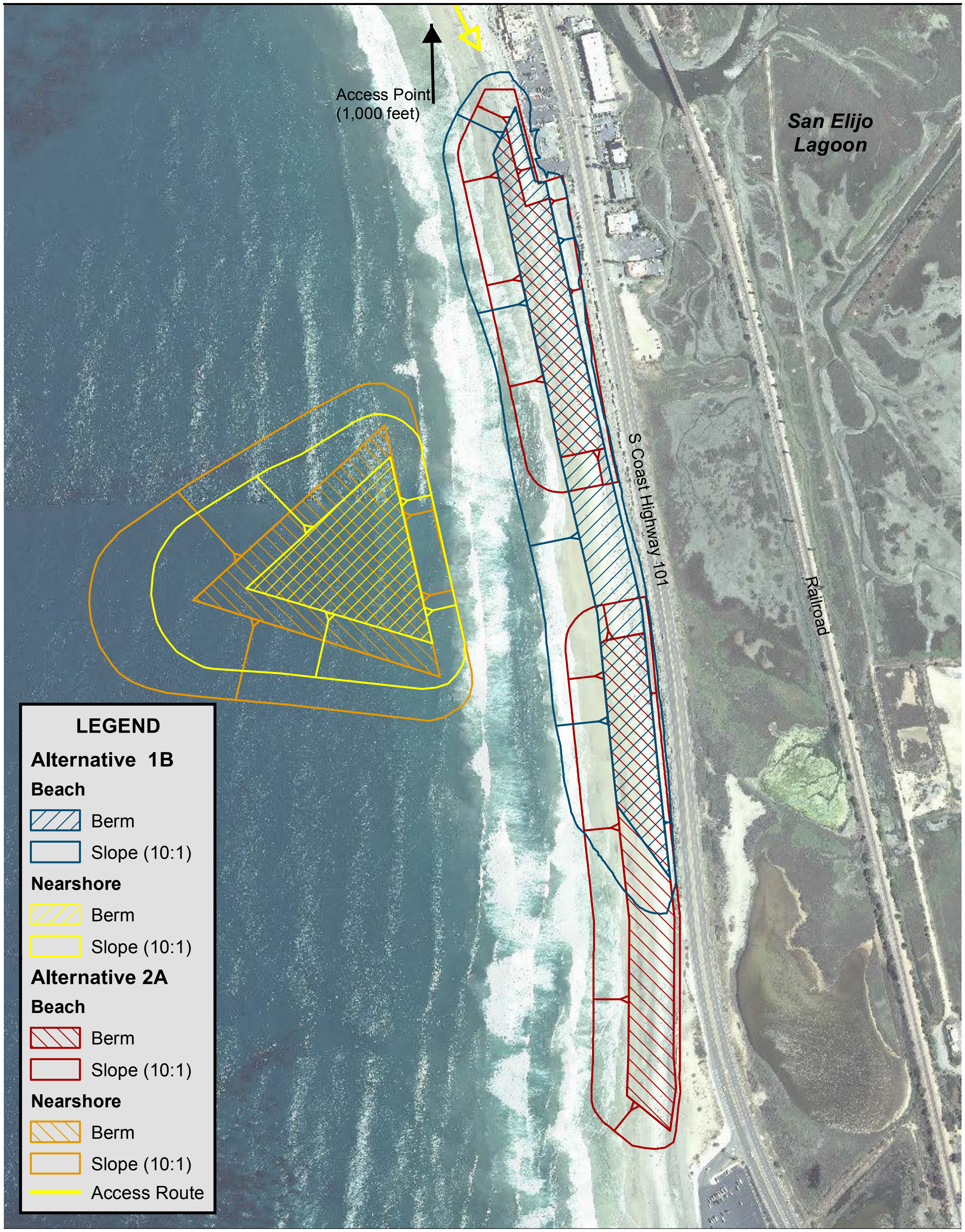
Figure 2-11B
Materials Placement Site
Moonlight Beach

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\Disposal_Sites_series.mxd, 7/23/2014, janssenn



Source: SANDAG 2012; MoffattNichol; AECOM 2014

500 250 0 500 Feet

Scale 1:6,000; 1 inch = 500 feet

Figure 2-11C
Materials Placement Site
Cardiff Alternatives 1B, 2A

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\Disposal_Sites_series.mxd, 7/23/2014, janssenn

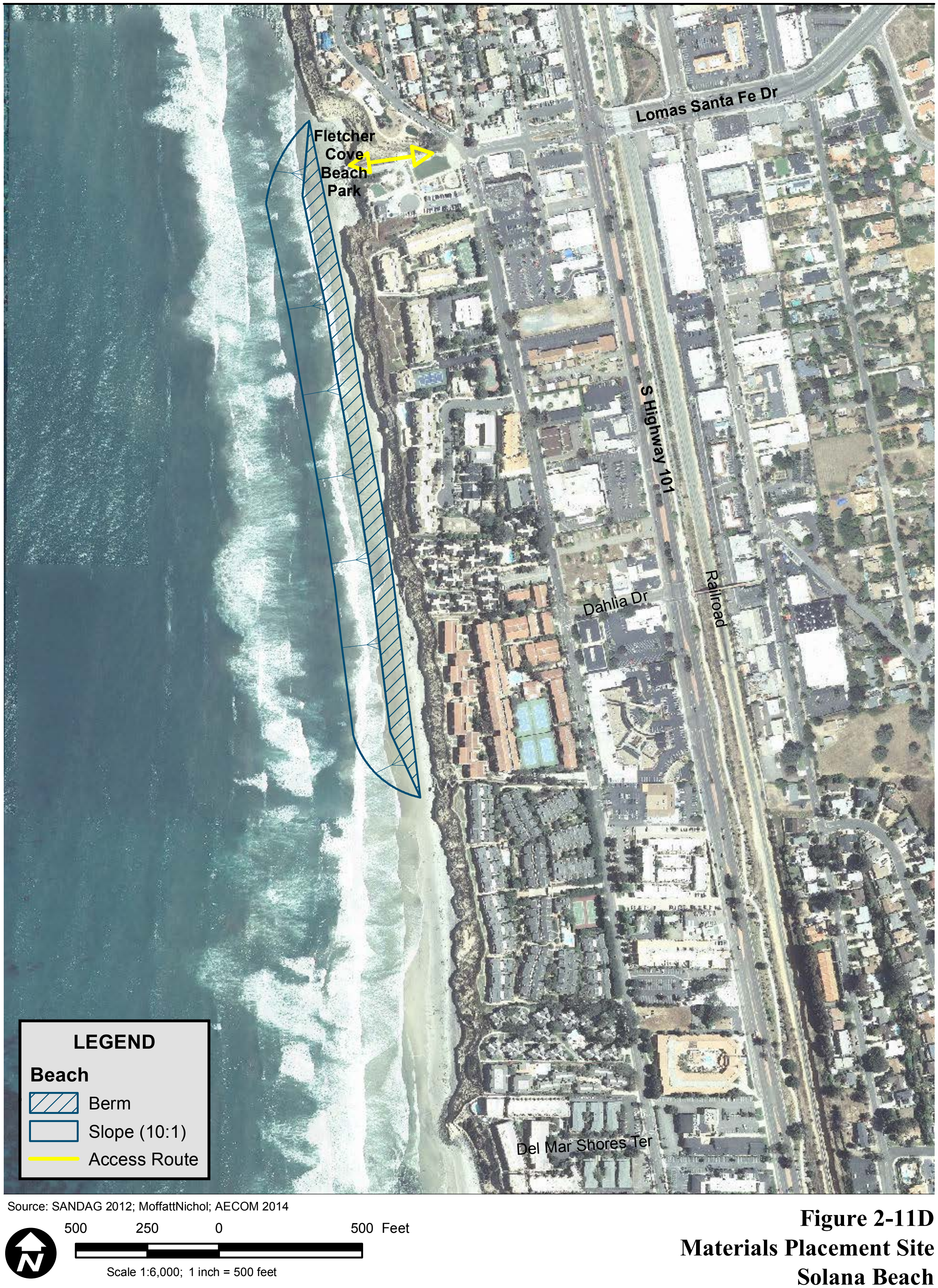


Figure 2-11D
Materials Placement Site
Solana Beach

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Figure 2-11E
Materials Placement Site
Torrey Pines

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\Disposal_Sites_series.mxd, 7/23/2014, janssenn

other basins are under construction. Although the work would generally occur in sequenced phases, it is anticipated that construction would occur year-round and these phases would be implemented without pause. Figures 2-16 and 2-17 illustrate the proposed construction phasing and sequencing for Alternative 2A and Alternative 1B, respectively. Some construction activities would be restricted to daytime hours, but some activities require 24 hours a day of operation to remain efficient (e.g., dredging and materials disposal/placement activities). Additionally, some activities such as materials delivery may be scheduled for nighttime hours to minimize additional effects, such as traffic or circulation (e.g., movement of pedestrians and motorized and/or nonmotorized vehicles) during summer hours. These nighttime activities may require limited temporary lighting for safety purposes. Phasing would allow the SELC to incorporate restrictions on specific construction activities to minimize effects to sensitive resources within the lagoon. For example, clearing and grubbing of habitat areas would be restricted to outside of the bird breeding season to limit effects to breeding bird populations. Other examples are outlined in the project design features table at the end of this section (Table 2-26).

Table 2-21
Overview of Project Elements and Responsible Parties for Construction

Project Element	SELRP	Caltrans	SANDAG/NCTD	Other (TBD)
Lengthen I-5 bridge over San Elijo Lagoon		X		
Lengthen railroad crossing over San Elijo Lagoon			X	
Coast Highway 101 bridge (new inlet)	X (Alt. 2A only)			
Seismic retrofit of Coast Highway 101 (existing inlet)				X
Dredge and replant lagoon	X			

2.10.1 CONSTRUCTION APPROACH

Alternative 2A

Construction Phasing and Sequencing

Table 2-22 outlines the anticipated sequence of activities and general durations for each phase of implementation of Alternative 2A. Construction of Alternative 2A could take up to approximately 36 months. This alternative would require construction of a bridge along Coast Highway 101 at the new inlet location, which would occur concurrently with lagoon enhancement work. Figure 2-12 shows potential disturbance limits for Alternative 2A. Phasing and sequencing for the proposed project related to specific areas designated for flooding and dredging are illustrated in Figure 2-16.

Alternative 2A would allow for construction of an overdredge pit within the central basin to provide on-site disposal of fine material removed from shallow cuts throughout the central, east, and west basins. These fine materials are not suitable for beneficial reuse through placement on beaches or in the littoral zone. Materials dredged from the overdredge pit would be from deeper, more coarse-grained sediments that are anticipated to be suitable for beneficial reuse in the littoral system based on soil investigations (M&N 2013). Phase 1 would create the pit by removing up to 1.4 mcy from the proposed overdredge pit area in the central basin (underlying the mudflat/channel area shown in Figure 2-3). The pit would be located in a portion of the lagoon containing nutrient-rich sediments. Removal of these sediments is critical to improve water quality impairments in the lagoon.

The SELRP construction methodology would primarily utilize dredge equipment to remove soils within wetland areas of the lagoon. This construction approach minimizes compaction of wetland soils, which can affect their ability to support wetland vegetation and invertebrate communities after restoration. Work could occur using a cutterhead suction dredge or similar equipment that would likely be mobilized to the site by truck, assembled on-site, and launched into the basin. Sand would be pumped from the lagoon to various placement sites by pipe and/or by a transport vessel located offshore. A diesel or electric dredge could be used; if the dredge is electric, facilities for electrical power would be provided in the form of a small (10 feet by 10 feet and 8 feet high) temporary on-site electrical substation located within staging area 5 (Figure 2-15). This facility is further described in Section 2.10.2 and would only remain on-site during construction.

Table 2-22
Anticipated Construction Phasing Schedule – Alternative 2A

	Phase 1	Phase 2	Phase 3	Phase 4
Activity	Construct dikes (1 & 2) in central basin and confirm/improve CDFW dike (3) to prevent flooding to the east Close dike 1 at low tide to leave dry and create refugia for species Close dike 2 at high tide and perch water elevation up to +6 feet NGVD to launch and float dredge Clear/grub central basin vegetation of 25,000 cy (3 months) in dredge area and export to disposal location through site access (#7) Reopen dike 2 after dredge reaches the overdredge pit location, leaving the lagoon open to tidal action Overdredge pit of 1.4 mcy and pump sand to onshore/ nearshore/offshore placement sites (10 months) Complete North Rios access road improvements and other staging/access area preparation (including site 7 with 5,000 cy of imported earth material)	Again, close dike 2 at high tide to perch water at +6 feet NGVD in central basin and west portion of east basin Dredge central basin over 7 months • widespread dredging (650,000 cy) in central basin to overdredge pit • construct central basin transitional areas • clear and grub central basin at channels (60,000 cy) • clear and grub east basin between I-5 and CDFW dike (240,000 cy) Construct dike 4 under I-5 to enable flooding of entire east basin during Phase 3 Release dike 2 and open central basin to tidal action and recovery	Maintain flooding in east basin to +5 NGVD using dike 4 and lower CDFW dike 3 Clear/grub east basin east of CDFW dike (30,000 cy) Dredge east basin to overdredge pit over 7 months (700,000 cy) Construct east basin transitional areas Lower dike 4 under I-5 and open east basin to tidal action and recovery	Build dike 5 and protective dike in west basin (6) Close dike 5 at high tide to flood west basin to +6 feet NGVD Clear/grub west basin (10,000 cy) Dredge to create inlet and subtidal basin (200,000 cy) to overdredge pit, nest site, and/or littoral cell placement sites Open new tidal inlet to ocean Lower dikes, leaving lagoon open to tidal action through new tidal inlet
Flooding Requirements (Duration/ Elevation)	After closing central basin dike 2, flood central basin to +6 feet NGVD for up to 3 months (initiate outside of breeding season) to launch dredge and clear and grub central basin, then drain and complete dredging of overdredge pit for 10 months while lagoon is open to tidal action	Flood central basin to +6 feet NGVD for 7 months to allow shallow dredging; flood east basin between I-5 and CDFW dike for clear and grub (6 months); west basin remains open to tidal action	Flood east basin for 7 months to +5 feet NGVD to allow shallow dredging; central and west basins remain open to tidal action	Flood west basin for 4 months to +6 feet NGVD to allow shallow dredging of west basin; remainder of lagoon remains open to tidal action

	Phase 1	Phase 2	Phase 3	Phase 4
Quantity/ Equipment	Clear and grub 25,000 cy with barge and haul trucks Dredge 1.4 mcy with a large dredge Road and staging/access point preparation equipment, such as bulldozers, backhoes, front-end loaders, earthmovers, graders Import of 10,000 cy of gravel from off-site for road/staging sites Import of 5,000 cy of earthen material for site 7 preparation (from I-5 North Coast Corridor Project) Import up to 50,000 cy of material for dike construction (from I-5 North Coast Corridor Project)	Clear and grub 300,000 cy with barge and haul trucks Dredge 650,000 cy with smaller dredge(s)	Clear and grub 30,000 cy with barge and haul trucks Dredge 700,000 cy with smaller/mid-size dredge(s)	Clear and grub 10,000 cy with barge and haul trucks Dredge 150,000 cy with a smaller dredge and place in pit as 50,000 cy of backfill (silts) and cover with up to approximately 130,000 cy sand cap; Excavate inlet under Coast Highway 101 (<50,000 cy of sand) with earthmoving equipment to the nest site and the beach
Coast Highway 101 Work	Start Coast Highway 101 Detouring – Build Bridge and Approaches; construct dike 7 and haul road through southern portion of west basin	Continue Coast Highway 101 Detouring – Build Bridge and Approaches	Complete Coast Highway 101 Detouring – Build Bridge and Approaches	No work on Coast Highway 101
General Timeline	Winter 2016 –Winter 2017	Winter 2017 – Fall 2018	Fall 2018 – Spring 2019	Spring – Fall 2019

Notes:
1. Mobilization of specific equipment would occur prior to each phase. Activities associated with mobilization/demobilization would not occur within lagoon-sensitive habitats outside the proposed disturbance footprint. Areas within the disturbance footprint may experience vegetation clearing and/or grading.
2. These phases anticipate a start date of January 2016. If the schedule is shifted, restrictions on specific activities (e.g., clear and grub and the initiation of flooding would occur outside the breeding season) would continue to be implemented per Table 2-26.

CDFW = California Department of Fish and Wildlife; cy = cubic yards; I-5 = Interstate 5; mcy = million cubic yards; NGVD = National Geodetic Vertical Datum

Dredging and Flooding Requirements

The overdredge pit proposed as part of Alternative 2A would be created during Phase 1 of construction to provide a location for finer materials disposal later in the construction process. The location of the overdredge pit is shown in Figures 2-12 and 2-13. The pit size and location have been designed to accommodate the required capacity of dredging needed, minimize direct impacts to sensitive habitats, and be located in areas designated for removal of high-nutrient sediments causing eutrophication in the lagoon. Phase I also includes clearing and grubbing of the central basin while it is flooded for 3 months. The overdredge pit would be dredged by launching a dredge into the central basin and allowing it to remain in the basin until dredging is complete to provide the required capacity. This dredging procedure does not require flooding of the central basin for an extended period, but only for a time sufficient to launch the dredge, move it to the pit location, and dredge a small subtidal working area to initiate large-scale dredging. Overdredge pit dredging can occur during open lagoon mouth conditions and is expected to take 10 months.

Once creation of the overdredge pit has been completed, shallow dredging of finer materials not suitable for reuse within the littoral zone would occur in specific locations under Alternative 2A and Alternative 1B. This would occur in Phase 2 of the project. Prior to shallow dredging proposed throughout the remainder of the lagoon, portions of the lagoon would need to be flooded with the use of strategically placed dikes to approximately +6 feet NGVD (central basin, and east to the CDFW dike in the east basin) to adequately accommodate a dredge. The west portion of the east basin would also flood back to the existing CDFW dike during this phase. The dike would be left in place and improved, as necessary, to prevent extended inundation of riparian habitat areas east of the dike. The east basin would continue to capture inputs from upstream, and to protect existing sensitive brackish and riparian habitat, water levels east of the CDFW dike would be maintained at elevations less than +5 feet NGVD. Pipes would be placed over the containment dike(s) to allow water to be pumped into or out of the lagoon to maintain a relatively consistent depth (e.g., releasing excess freshwater flows or adding replacement water, as needed, the dredge discharges its slurry outside of the flooded area). After construction of the dikes and water level control equipment, the lagoon could be flooded by closing the dikes at high tide. Shallow dredging throughout the basins could then occur; dredged materials from shallow cuts made within the basin would be placed in the overdredge pit via a temporary pipeline extending through the lagoon.

Three distinct areas have been identified as refugia for sensitive species during flooding, along the northwest side of the central basin, southeast of the former sewage ponds within the central basin, and the west basin itself. Containment dikes would be required to maintain the two refugia areas in the central basin, but the west basin would remain either dry or open to tidal influence until dredging occurs within that basin in Phase 4. Dikes would be constructed using existing access roads. It is not anticipated that earthen material would need to be imported from off-site. Earthen material needed for internal fill for lagoon restoration would come from the I-5 bridge construction project that would yield a high volume of surplus material. Approximately 155,000

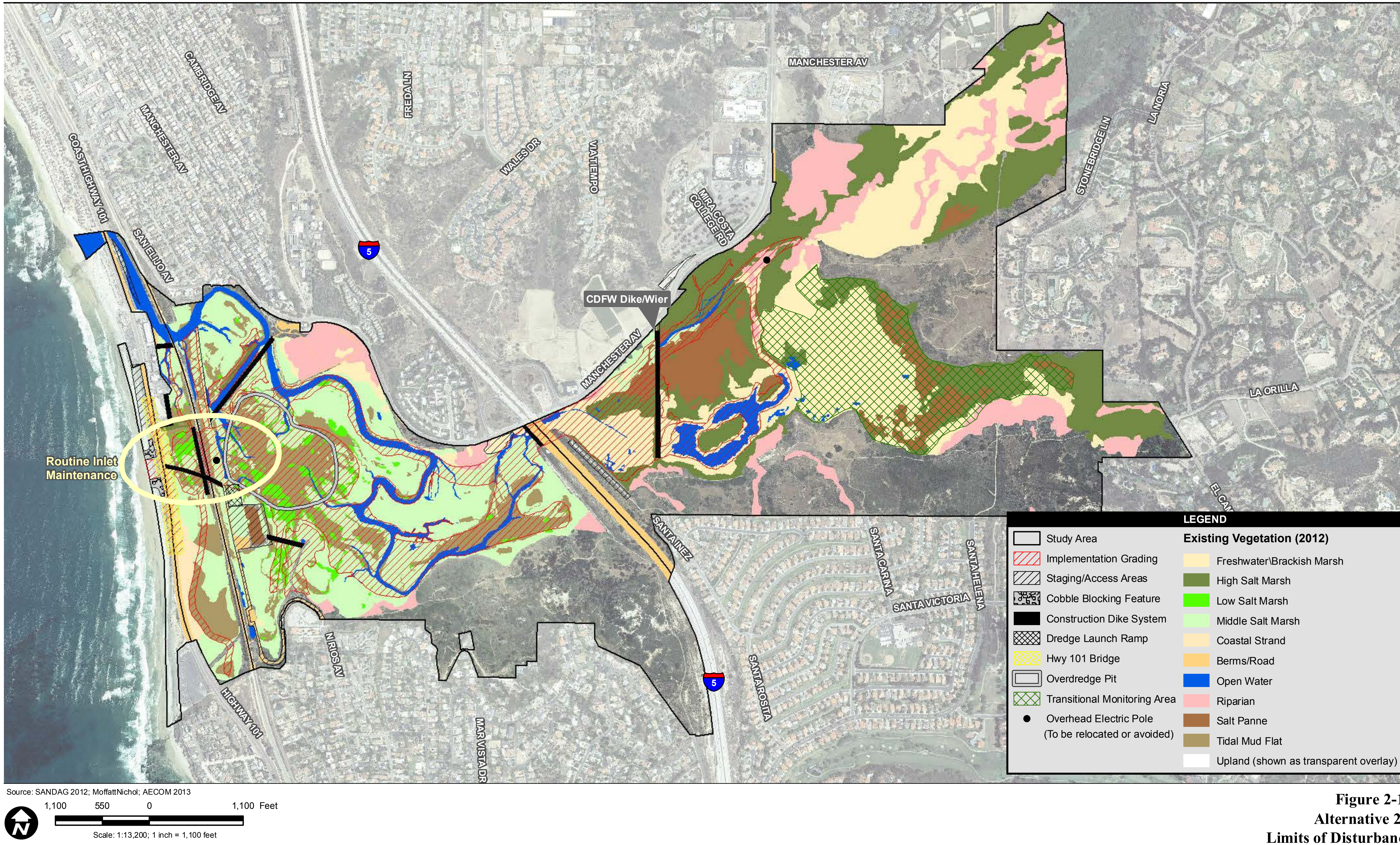

Figure 2-12
Alternative 2A
Limits of Disturbance

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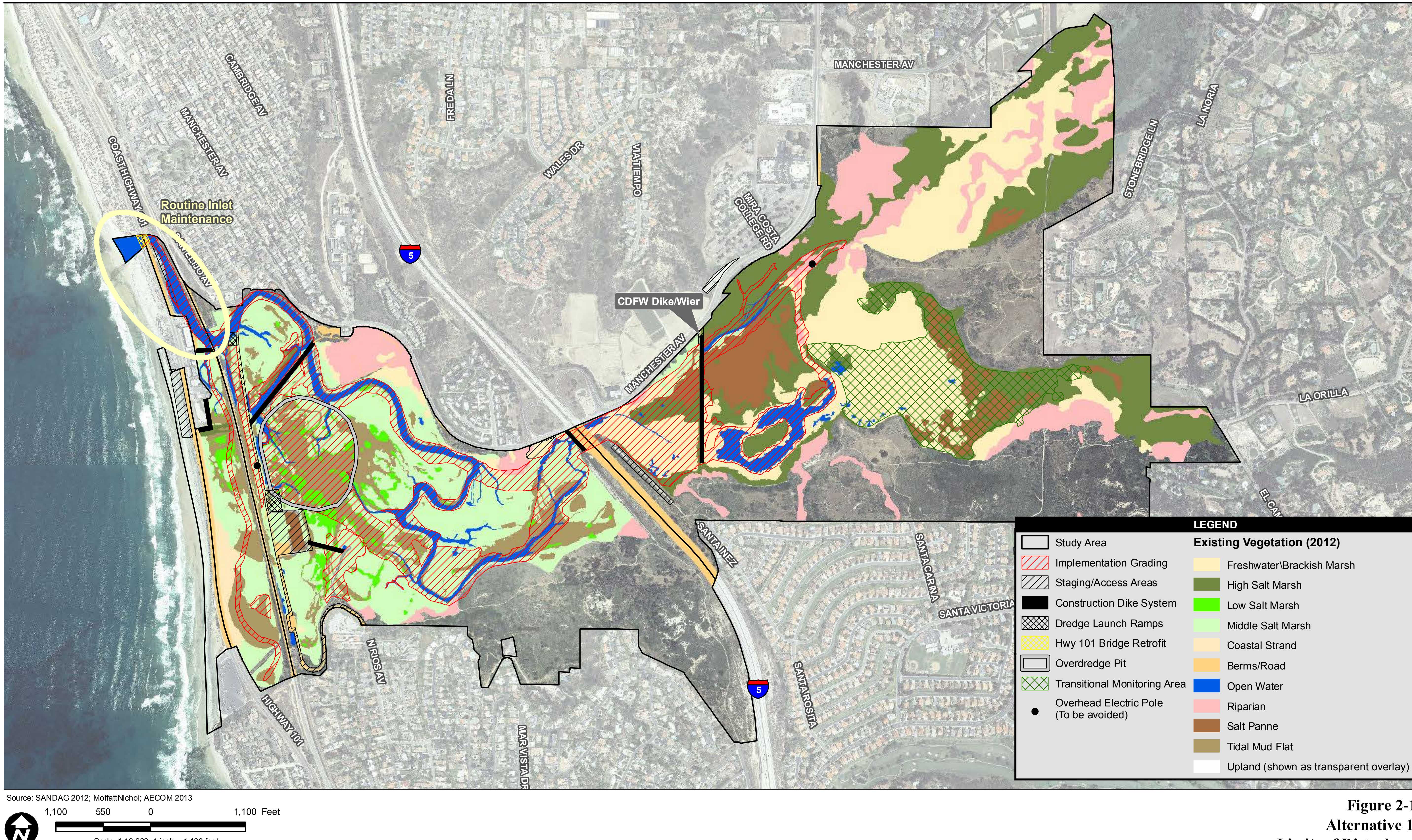

Figure 2-13
Alternative 1B
Limits of Disturbance

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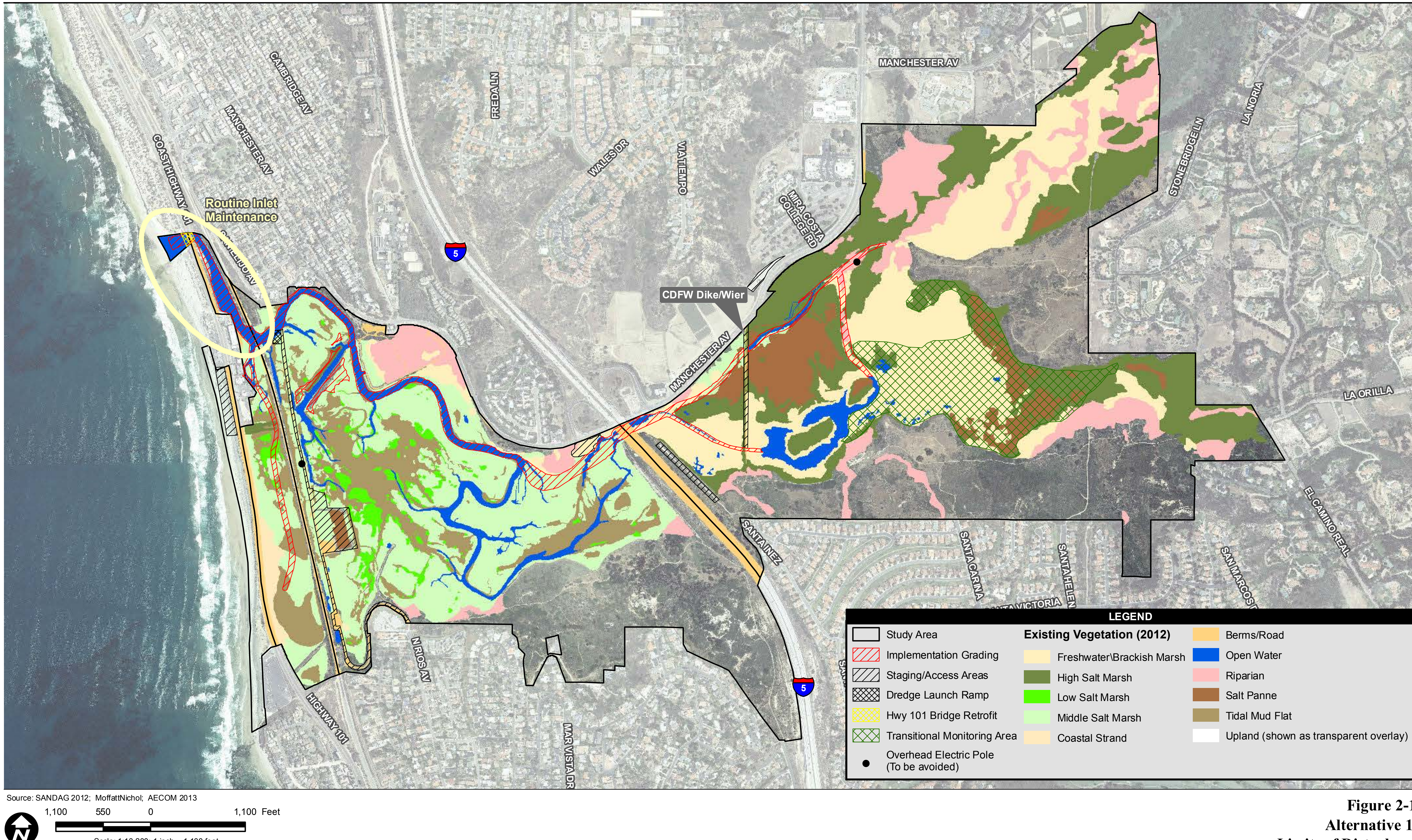

Figure 2-14
Alternative 1A
Limits of Disturbance

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cy of surplus material could be transferred from the I-5 bridge construction site to on-site stockpile staging locations in haul trucks. Approximately 50,000 cy of material would be required to construct the dikes. Earthmoving equipment would utilize existing access roads (e.g., along the railroad) and then begin to construct a raised platform out into the lagoon from those disturbed edges at the proposed locations. Approximately 10,000 cy of gravel would be imported from off-site to improve the internal road network sufficiently to support the work. Another 5,000 cy of material would be imported to prepare site 7 along Manchester Avenue in the central basin.

The containment dike within the southern part of the central basin would be closed off at low tide to reduce the water volume trapped in the refugia area within the southwest part of the central basin. The containment dike within the northern part of the central basin would be closed off at high tide to retain as much water within the dredge area as possible. The two dikes in the central basin would remain closed until the end of Phase 2, with a period of time when the northwest dike 2 would be breached to allow tidal action while the main overdredge pit is being created during Phase 1. In Phase 1, approximately 1.4 mcy of sediment would be dredged and beneficially reused in the littoral zone nearshore and/or onshore placement, or staged immediately outside of the littoral zone (offshore stockpiling). Up to approximately 130,000 cy of sand would be retained to cap the overdredge pit at the end of Phase 4. A sand cap is required for Alternative 2A because the new inlet results in a higher energy condition at the pit location compared to the existing inlet alternative of 1B.

Flooding of the central basin would last up to approximately 3 months in Phase 1, and 7 months in Phase 2, with an interim period of approximately 10 months during Phase 1 when no flooding would be required while the overdredge pit is created. After Phase 2, flooding of the central basin would be released to open the basin to tidal action and allow for habitat recovery to begin.

Phase 2 would dredge approximately 650,000 cy of silts and clays from the central basin and discharge it into the overdredge pit. A small quantity of material (approximately 35,000 cy) would also be placed at three man-made transitional areas within this basin after dewatering in the former sewage ponds (staging area 5 in Figure 2-15). It is anticipated that this work would occur using one or more cutterhead suction dredges. Dredge(s) would be mobilized to the site by truck, assembled on-site, and launched into the basin.

At the end of Phase 2, the east basin would remain flooded at a maximum water elevation of +5 NGVD through construction of a dike at I-5 and removal of the CDFW dike, and shallow dredging within that basin would occur in Phase 3. Dredged materials from that basin would be placed in the overdredge pit via a temporary pipeline extending through the lagoon. Phase 3 would dredge approximately 700,000 cy of silts and clays from the east basin and discharge it into the overdredge pit, with approximately 10,000 cy being placed at one man-made transitional area after dewatering. It is anticipated this work would also be completed using cutterhead suction dredges. Flooding of the east basin would last up to approximately 7 months for dredging. After Phase 3, containment dike 4 would be removed and flooding released to open the basin to tidal action and allow for habitat recovery to begin.

During Phase 4, the west basin would be flooded by constructing a dike at the channel entrance and allowing a high tide to flood the area or by pumping water into the basin. Additional dikes may be required within the west basin during flooding to protect adjacent low-lying development, as shown in Figure 2-16. Phase 4 would dredge approximately 150,000 cy of silts, clays, and sand from the west basin, and use earthmoving equipment outside of the dredge area to excavate another approximately 50,000 cy of sand from under the new Coast Highway 101 bridge at the proposed tidal inlet location. Silts and clays would be discharged into the overdredge pit. Up to approximately 130,000 cy of sand would be used to cap the pit and approximately 35,000 cy of sand would be placed at the proposed nesting site, with the balance (35,000 cy) going to the beach for onshore or nearshore placement. It is anticipated this work would be completed using a small cutterhead dredge plus excavators, backhoes, scrapers, bulldozers, and possibly offroad trucks for earthmoving activities at the tidal inlet. The proposed inlet would be opened as the last construction task, and the existing inlet allowed to gradually close over time.

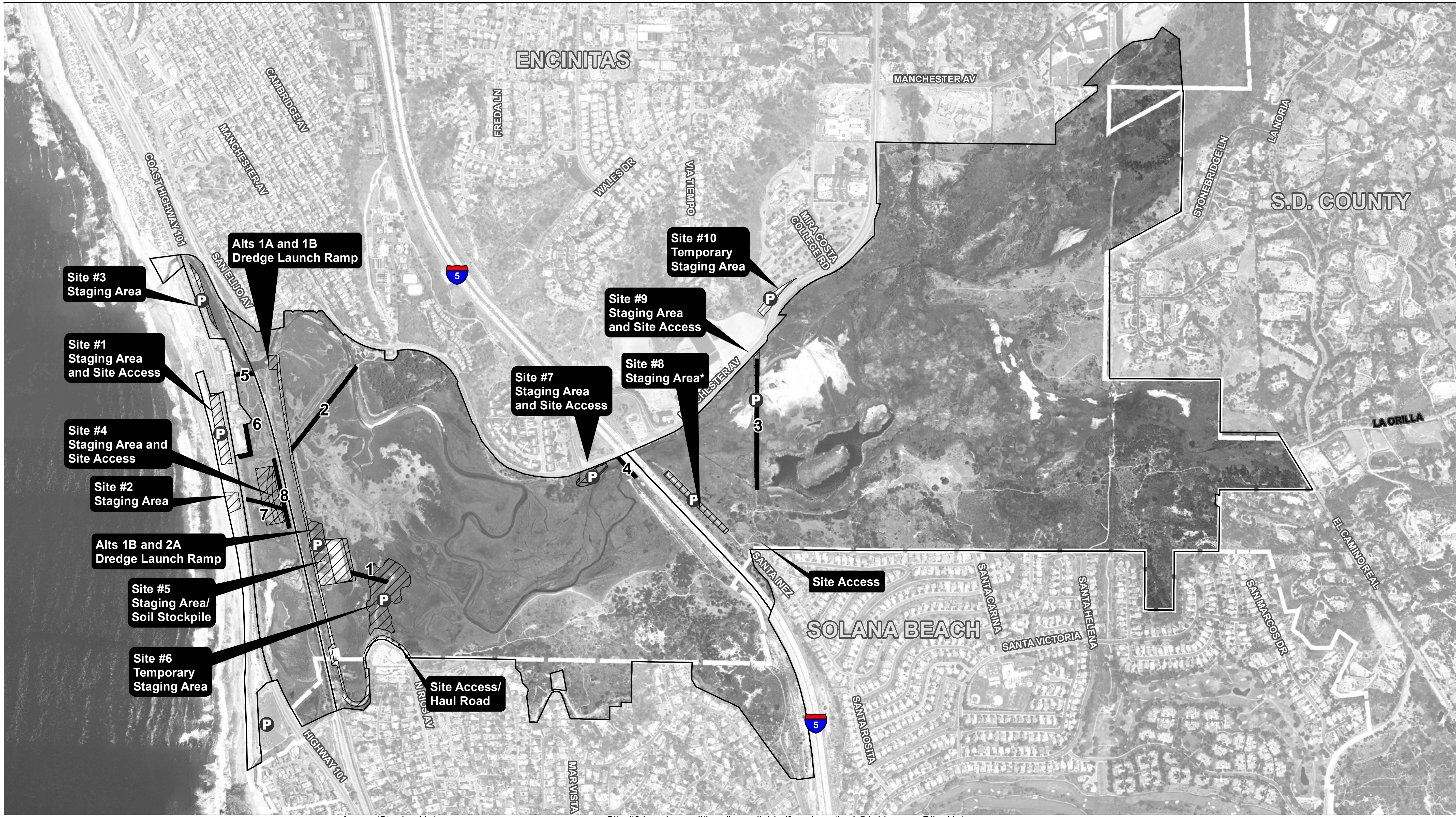
Coast Highway 101 Construction Activities

Under Alternative 2A, a new Coast Highway 101 bridge would be constructed over the new inlet as fully detailed in Section 2.10.10. Construction on Coast Highway 101 associated with Alternative 2A would last approximately 18 months and occur concurrently with lagoon restoration activities. Figure 2-5 illustrates the proposed construction approach for the new bridge structure. Work on the west and east halves of the roadway would be conducted sequentially, allowing for one side of the new bridge to be constructed and poured first, while traffic would use the other half of existing Coast Highway 101 to maintain continual access in both directions. Details are provided in Section 2.10.

Alternative 1B

Construction Phasing and Sequencing

Table 2-23 describes generalized construction phases of work for Alternative 1B. This alternative would also include retrofitting the existing bridge along Coast Highway 101, which would occur



Source: SANDAG 2012; MoffattNichol; AECOM 2013

1,100 550 0 1,100 Feet

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

Access/Staging Notes:
Alternative 2A Includes All Sites (1-10)
Alternative 1B Includes All Sites except for 4
Alternative 1A Includes All Sites except for 2, 4 and 6

Site #8 is only conditionally available if work on the I-5 bridge replacement project has not been initiated or has already been completed. Shared access may also be appropriate as part of the coordinated GC/CM approach anticipated for implementation of the SELRP.

Dike Notes:
Construction Dike System Numbered 1-8
Dike 3 Utilizes Existing CDFW Dike Prior to Removal/Improvement

P indicates employee parking area

Figure 2-15
Access/Staging Areas and Construction Dike System

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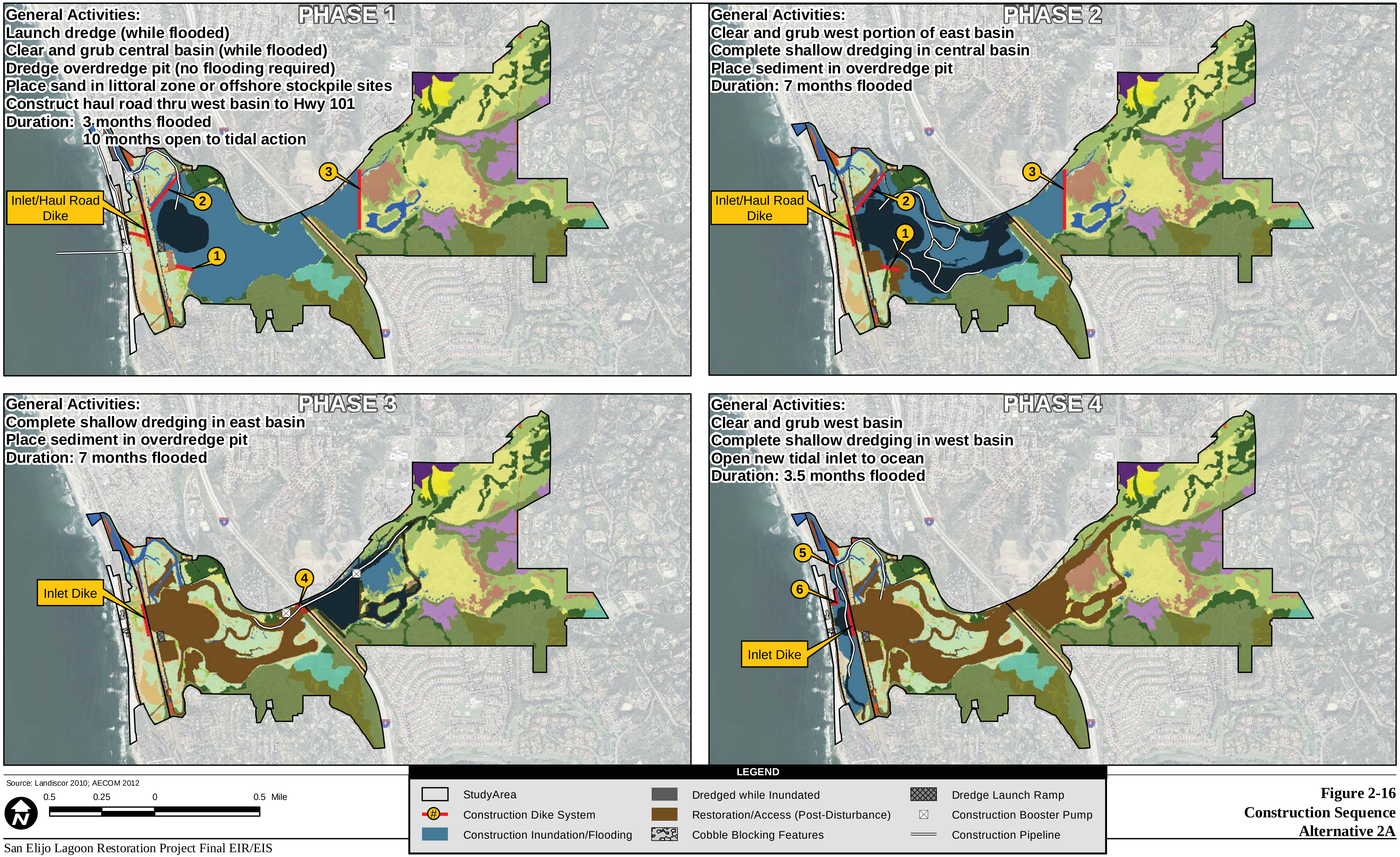

Figure 2-16
Construction Sequence
Alternative 2A

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concurrently with lagoon enhancement work. Figure 2-13 shows potential disturbance limits for Alternative 1B. Phasing for the project related to specific areas designated for flooding and dredging is illustrated in Figure 2-17. Implementation of Alternative 1B would incorporate similar phasing for construction activities as that presented for Alternative 2A.

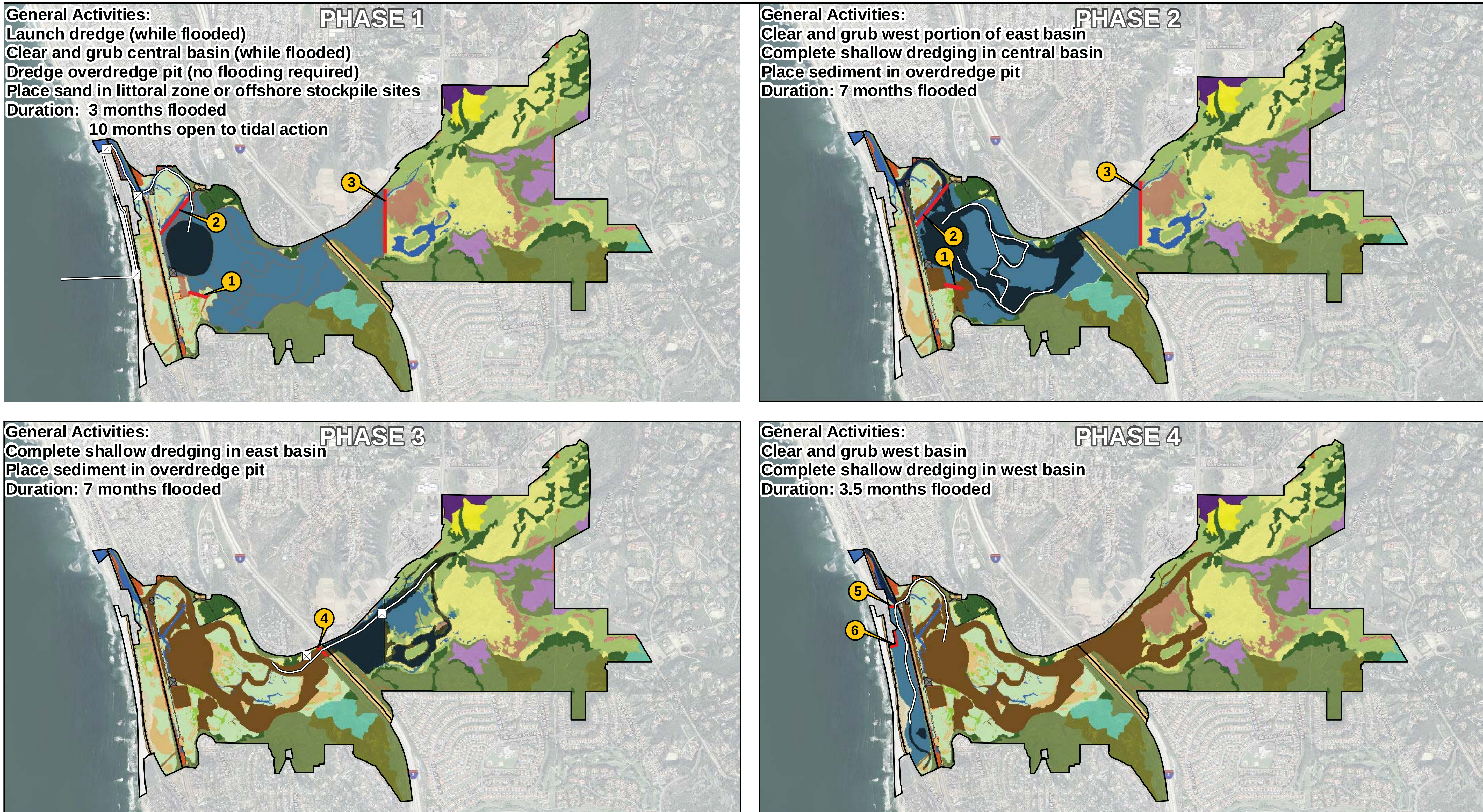
Table 2-23
Anticipated Phasing Schedule – Alternative 1B

	Phase 1	Phase 2	Phase 3	Phase 4
Activity	Construct dikes (1 & 2) in central basin and confirm/improve CDFW dike (3) to prevent flooding to the east Close dike 1 at low tide to leave dry and create refugia for species Close dike 2 at high tide and perch water elevation up to +6 feet NGVD to launch and float dredge to overdredge pit location Clear/grub central basin vegetation of 25,000 cy (3 months) in dredge area and export to disposal location through site access (7) Reopen dike 2 after dredge reaches overdredge pit location, leaving lagoon open to tidal action Overdredge pit of 1.2 mcy and pump sand to onshore/nearshore/offshore placement sites (10 months) Complete North Rios access road improvements and other staging/access area preparation (including site 7 with 5,000 cy of imported earth material)	Again, close dike 2 at high tide to perch water at +6 feet NGVD in central basin and west portion of east basin Clear and grub channel areas in the CB (60,000 cy) Dredge central basin over 7 months • widespread dredging in central basin to overdredge pit (550,000 cy) • construct central basin transitional areas • clear and grub east basin between I-5 and CDFW dike (240,000 cy) Construct dike 4 under I-5 to enable flooding of entire east basin during Phase 3 Release dike 2 and open central basin to tidal action and recovery	Maintain flooding in east basin to +5 NGVD using dike 4 and lower CDFW dike 3 Clear/grub east basin east of CDFW dike (30,000 cy) Dredge east basin (700,000 cy) to overdredge pit (7 months) Construct east basin transitional areas Lower dike 4 under I-5 and open east basin to tidal action and recovery	Build dike 5 and protective dike in west basin (6) Close dike 5 at high tide to flood west basin to +6 feet NGVD Clear/grub west basin (10,000 cy) Dredge channel network in basin to overdredge pit, nest site, and/or littoral cell placement sites Lower dikes, leaving basin and rest of lagoon open to tidal action Clear tidal inlet and channel to design dimensions
Flooding Requirements	After closing central basin dike 2, flood central basin to	Flood central basin for 7 months to allow	Flood east basin for 7 months to +5	Flood west basin to +6 feet NGVD for

	Phase 1	Phase 2	Phase 3	Phase 4
(Elevation and Duration)	+6 feet NGVD for up to 3 months (initiate outside of breeding season) to launch dredge and clear and grub central basin, then drain and complete dredging of overdredge pit for 10 months while lagoon is open to tidal action	shallow dredging; flood east basin between I-5 and CDFW dike for duration of clear and grub (6 months); west basin remains open to tidal action	feet NGVD to allow shallow dredging; central and west basins remain open to tidal action	up to 4 months to allow shallow dredging of west basin; remainder of lagoon remains open to tidal action
Quantity/ Equipment	Clear and grub 25,000 cy with barge and haul trucks Dredge 1.2 mcy with a large dredge Road and staging/access point preparation equipment, such as bulldozers, backhoes, front-end loaders, earthmovers, graders Import of materials for road/staging sites (10,000 cy) Import of 5,000 cy of earthen material for site 7 preparation Import of material for dike construction (up to 50,000 cy)	Clear and grub 300,000 cy with barge and haul trucks Dredge 550,000 cy with smaller dredge(s)	Clear and grub 30,000 cy with barge and haul trucks Dredge 700,000 cy with smaller/mid-size dredge(s); cap pit with up to 130,000 cy of sand from the lower layers, allow room for additional backfill and capping in Phase 4.	Clear and grub 10,000 cy with barge and haul trucks Dredge 50,000 cy with a smaller dredge and place in pit as 50,000 cy of backfill (silts), and/or use sand for nesting site.
Coast Highway 101 Work	Potential retrofit activities for Coast Highway 101 initiated – create detours on roadway and drill pilings for retrofit	Continue Coast Highway 101 retrofit activities	Continue Coast Highway 101 retrofit activities	No work on Coast Highway 101
General Timeline	Winter 2016 –Winter 2017	Winter 2017 – Fall 2018	Fall 2018 – Spring 2019	Spring – Fall 2019

Notes:
1. Mobilization of specific equipment would occur prior to each phase. Activities associated with mobilization/demobilization would not occur within lagoon-sensitive habitats outside the proposed disturbance footprint. Areas within the disturbance footprint may experience vegetation clearing and/or grading.
2. These phases anticipate a start date of January 2016. If the schedule is shifted, restrictions on specific activities (e.g., clear and grub and the initiation of flooding would occur outside the breeding season) would continue to be implemented per Table 2-26.

CDFW = California Department of Fish and Wildlife; cy = cubic yards; I-5 = Interstate 5; mcy = million cubic yards; NGVD = National Geodetic Vertical Datum



Source: Landiscor 2010; AECOM 2012

0.5 0.25 0 0.5 Mile

LEGEND

StudyArea
Construction Dike System
Construction Inundation/Flooding
Dredged while Inundated
Restoration/Access (Post-Disturbance)
Dredge Launch Ramps
Construction Booster Pump
Construction Pipeline

Figure 2-17
Construction Sequence
Alternative 1B

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Similar to Alternative 2A, Alternative 1B would allow for construction of an overdredge pit within the central basin to provide on-site disposal of fine material not suitable for beneficial reuse. Phase 1 would create the pit by removing up to 1.2 mcy from the proposed overdredge pit area in the central basin (underlying the mudflat/channel area shown in Figure 2-17). Similar to Alternative 2A, the overdredge pit size and location have been designed to accommodate material dredged from the lagoon and be located in areas designated for removal of high-nutrient sediments, while minimizing impacts to sensitive habitats to the extent feasible. As with Alternative 2A, work could occur using a cutterhead suction dredge, or similar equipment and sand would be pumped from the lagoon to various placement sites by pipe and/or by a transport vessel located offshore. If the dredge is electric, a small (approximately 10 feet by 10 feet and 8 feet high) temporary on-site electrical substation would be required as described in Section 2.10.2.

Dredging and Flooding Requirements

Similar to Alternative 2A, restoration of the lagoon under Alternative 1B requires dredging an overdredge pit first, with materials placement in various nearby offshore, nearshore, and onshore locations. Creation of the overdredge pit would be followed by shallower dredging of habitat areas, with material disposal into the overdredge pit. The construction approach to create the overdredge pit would be similar to that described for Alternative 2A. Prior to shallow dredging proposed throughout the remainder of the central basin, dike 2 would be closed a second time and the central basin of the lagoon would be flooded to approximately +6 feet NGVD to accommodate a dredge. Similar to the approach described for Alternative 2A, temporary dikes 1 and 2 would be constructed to constrain flooded areas and provide refuge for sensitive resident birds. Dikes would be constructed using existing access roads and material excavated from the lagoon and/or imported from off-site. Approximately 50,000 cy of material would be required to construct the dikes. Earthmoving equipment would utilize existing access roads (e.g., along the railroad) and then begin to construct a raised platform out into the lagoon from those disturbed edges at the proposed locations. Approximately 10,000 cy of gravel would be imported from off-site to improve the internal road network sufficiently to support the work, and 5,000 cy of earthen material may be imported to prepare Site 7 along Manchester Avenue in the central basin.

After flooding the central basin, Phase 2 would dredge approximately 550,000 cy of silts and clays from the flooded area and discharge it into the overdredge pit. A small quantity of material (approximately 35,000 cy) would also be placed at three man-made transitional areas within this basin after dewatering at the former sewage pond site (shown as Site 5 in Figure 2-15). It is anticipated that this work would occur using one or more cutterhead suction dredges. Clearing and grubbing of the east basin west of the CDFW dike would also occur in this phase.

Phase 3 would dredge approximately 700,000 cy of silts and clays from the east basin and discharge it into the overdredge pit, with approximately 10,000 cy being placed at one man-made transitional area after dewatering. Sand from the lower layer of the east basin would cap the overdredge pit with a 3-foot minimum sand cap (up to approximately 130,000 cy). It is anticipated this work would also be completed using cutterhead suction dredges.

Phase 4 would dredge approximately 50,000 cy of silts, clays, and sand from the west basin for use in creating man-made transitional habitat. Silts and clays would be dewatered in the proposed nesting site (site 5 in Figure 2-15) prior to its construction. It is anticipated this work would be completed using a small cutterhead suction dredge. The dredge would then move from the west basin to the tidal inlet channel, and dredge 35,000 cy of sand and pump it to the proposed nest site location to complete that component. Removal of the dikes would also be completed in this phase with a backhoe mounted on a barge or from shore locations using a long-arm backhoe. In addition, two footbridges and a path would be installed over the main channel and the channel just east of the utility road, and along the top of the transition area in the central basin. This path and footbridges would link the visitor center loop trail and the end of the utility corridor road, resulting in a complete loop trail around the central basin. Proposed trail characteristics would include a 4- to 6-foot-wide trail with decomposed granite (2 to 3 inches deep) matching adjacent grade over geotextile and compacted subgrade. In areas where railing may be required, a split three-rail fence would be installed using native, rot-resistant wood or plastic lumber (not wood treated with rot resistant chemicals). Excavating the existing inlet and inlet channel, most likely with land-based earthmoving equipment, to the proposed configuration would be completed as a last task.

Coast Highway 101 Construction Activities

Under Alternative 1B, the existing Coast Highway 101 bridge would be retrofitted by others to increase its seismic stability and correct the existing seismic deficiencies of the structure inlet as fully detailed in Section 2.10.10. Retrofitting of the existing bridge along Coast Highway 101 would last approximately 8 months and could occur at any point in time during the project construction period. Active construction and lane closure along Coast Highway 101 would last approximately 3 months. Retrofit work would likely be phased, and completed under one-half of the existing bridge length while the tidal inlet channel is maintained in position under the other half of the existing bridge. Construction would begin with mobilization of equipment and materials, followed by construction of cast-in-drilled-hole (CIDH) piles, construction of pile caps, and construction of pier walls.

Alternative 1A

Construction Phasing and Sequencing

Table 2-24 illustrates phasing and construction activities associated with Alternative 1A. Construction of this alternative would require approximately 9 months since no overdredge pit would be constructed to provide material suitable for beneficial reuse within the littoral zone. Small volumes of dredged material may be suitable for on-site reuse, but the majority of material would be exported off-site to LA-5 via barge for materials disposal. Figure 2-14 shows potential disturbance limits for Alternative 1A. This alternative would also include retrofitting of the existing bridge along Coast Highway 101, which would occur concurrently with lagoon enhancement work.

Table 2-24
Anticipated Phasing Schedule – Alternative 1A

	Phase 1	Phase 2
Activity	Clear/grub vegetation to be removed along lagoon main channel (if needed); quantity may reach up to 70,000 cy maximum Launch dredge from north end of utility road Dredge in main channel (160,000 cy) and material export/disposal to LA-5	Construct transitional areas Clear tidal inlet and inlet channel to design dimensions and pump sand to nesting area.
Flooding	Not necessary	Not necessary
Quantity/Equipment	Dredge 160,000 cy with a small, medium, or large dredge; 10,000 cy goes to transition area	Dredge 35,000 cy with smaller dredge or equivalent type of equipment
Coast Highway 101 Work	Retrofit activities for Coast Highway 101 initiated – create detours on roadway and drill pilings for retrofit	Continue Coast Highway 101 retrofit activities
General Timeline	Winter 2016 – Winter 2017	Spring 2018

Notes:
1. Mobilization of specific equipment would occur prior to each phase. Activities associated with mobilization/ demobilization would not occur within lagoon-sensitive habitats outside the proposed disturbance footprint. Areas within the disturbance footprint may experience vegetation clearing and/or grading.
2. These phases anticipate a start date of January 2016. If the schedule is shifted, restrictions on specific activities (e.g., clear and grub and the initiation of flooding would occur outside the breeding season) would continue to be implemented per Table 2-26.

cy = cubic yards

Small areas would be used for on-site disposal of dredged material to construct the proposed nesting and transition areas (35,000 cy for the nesting area and 10,000 cy for the transition area, respectively). The majority of the material removed from the lagoon would be disposed of offshore at LA-5. Dredging and grading for Alternative 1A would be focused on enlarging the existing main channel. Limited shallow dredging is proposed, so unlike Alternative 2A and 1B that require extensive flooding of the lagoon basins, no flooding would be required for dredge work for Alternative 1A. Subsequently, no dikes or refugia areas would be needed.

Phase 1 under Alternative 1A would focus on clearing and grubbing the main channel, as needed. The dredge would be launched from the north end of the existing access road within the central basin, and the main channel dredged. Material dredged (approximately 160,000 cy) would be primarily disposed of offshore at LA-5. Phase 2 under Alternative 1A would dredge a small quantity of material (approximately 10,000 cy) to be placed at one man-made transitional area, and 35,000 cy of sand would be placed at the nesting site. It is anticipated that this work would occur using a cutterhead suction dredge. This phase would also clear the tidal inlet and inlet channel to the design dimensions and pump sand to the nesting area.

Coast Highway 101 Construction Activities

Similar to Alternative 1B, no new inlet would be required under Alternative 1A. The existing bridge along Coast Highway 101 would be retrofitted for current seismic deficiencies, however, as described under Alternative 1B. Identical construction methods, equipment, and schedule would be used for Coast Highway 101 retrofitting under Alternative 1A as detailed under Alternative 1B. See Table 2-24 for the general construction timing under Alternative 1A.

2.10.2 Construction Equipment Mobilization and Demobilization

Construction equipment and support items need to be mobilized, or brought, to the site for construction. The ultimate selection of construction equipment would depend upon the availability of equipment to the contractor at the time of construction. In addition to typical generalized construction equipment, potential equipment anticipated for construction of the SELRP includes the following:

- diesel-powered dredge
- electric-powered hydraulic cutterhead suction dredge as an option
- Up to 10,000 feet of steel pipe (e.g., 40-foot-long segments)
- Up to four booster pumps to transfer material to adjacent onshore, nearshore, and offshore stockpile areas (SO-6)

Typically, equipment would arrive by truck and enter the site through designated construction access points. Rock for CBFs and internal lagoon revetments may be brought over on a barge from Catalina Island to an existing dock yard at the Port of Los Angeles or San Diego and then transported south on I-5 via trucks to the project site. Alternatively, rock for the project may be delivered by trucks from quarries located in various locations, including Chula Vista and Corona, approximately 30 and 70 miles from the project site, respectively. Up to 60,000 cy of rock, weighing approximately 120,000 tons, could be required for channel and structure protection throughout the site, depending on the alternative selected.

Dependent upon contractor equipment selection, an electric dredge may be used and facilities for electrical power would be provided in the form of a small temporary on-site electrical substation. If necessary, the temporary electrical power site would be located north of the proposed nesting area and within staging area #5. The electrical power site would connect into existing poles and transmission lines adjacent to railroad tracks and would not require permanent new transmission infrastructure. A temporary pole may be necessary between the existing transmission lines to feed the power site. Electrical equipment would be contained within an enclosed metal structure, approximately 10 by 10 feet and 8 feet high. The small enclosure could be painted or fenced. The electrical equipment and enclosure would be removed at completion of construction.

Equipment mobilization could require up to 6 months due to the need for a dredge and associated materials (e.g., discharge pipe). It is anticipated that the initial 2 months would primarily include setting up a trailer on the site and establishing off-site management requirements. After that date, site and access preparation, dredge assembly, and some clear and grub activities would be initiated. Equipment and materials delivered to the site would be staged at designated areas over the duration of their use. Equipment demobilization would occur when construction is complete, and/or when the use of a particular piece of equipment is no longer needed. Equipment demobilization after project completion is typically relatively short as the contractor removes equipment from the site via designated access routes/points.

Alternative 2A

This alternative requires use of multiple suites of equipment for the various project components of dredging, earthwork, and roadwork. Each is listed below. Mobilization for this project would require approximately 6 months total.

Large-scale dredging equipment would be brought to the site, including a 24- to 26-inch dredge, discharge line (10,000 linear feet), crew boat, temporary dock and launch ramp, crane, front end loader, booster pumps (two to four), discharge barge, tug boat, survey boat, fueling drums, electrical power supply equipment, and a clamshell dredge or long-arm backhoe for rock placement along channels (if needed).

Earthwork would require multiple long-arm backhoes, excavators, large off-road trucks, scrapers, and bulldozers.

Roadwork would require demolition equipment such as a pile driver, crusher operation, pneumatic breaker, dump trucks, bulldozers, motor graders, front end loaders, cranes, concrete and asphalt placement equipment (pavers and rollers), a water truck, and forklifts. Crew size could range from five to 15 workers.

On-site materials disposal would utilize equipment described above for the lagoon enhancement component. Off-site materials disposal for Alternative 2A could include placement onshore, nearshore, and/or offshore at Cardiff and onshore placement at other coastal sites. Equipment required for materials transport and placement includes ocean-based equipment such as a monobuoy, pipeline, booster pumps, a barge, tug boat and work boat. Beach working equipment would also be required, including bulldozers, temporary lighting, and a temporary trailer. At other potential beach placement sites, equipment could include the same items.

<u>Alternative 1B</u>

Alternative 1B also requires use of multiple suites of equipment for the various project components of dredging and earthwork. Each is listed below. Mobilization for this project would require up to 6 months.

Large-scale dredging equipment would be brought to the site, including a 24- to 26-inch dredge, discharge line (10,000 linear feet), crew boat, temporary dock and launch ramp, crane, front end loader, booster pumps (two to four), discharge barge, tug boat, survey boat, fueling drums, electrical power supply equipment, and a clamshell dredge or long-arm backhoe for rock placement along channels (if needed).

Earthwork would require multiple long-arm backhoes, excavators, large off-road trucks, scrapers, and bulldozers.

Roadwork and retrofitting activities would require equipment including cranes with drill attachment, concrete mixer trucks, boom pump trucks, loaders, work trucks, forklifts, 10,000-gallon storage tank, and slurry recirculation pump. Crew size could range from five to 15 workers.

Similar to Alternative 2A, on-site materials disposal would utilize equipment described above for the lagoon enhancement component. Off-site materials disposal for Alternative 1B could include placement onshore, nearshore, and/or offshore at Cardiff and onshore placement at other coastal sites. Equipment required for materials transport and placement includes ocean-based equipment such as a monobuoy, pipeline, booster pumps, a barge, tug boat, and work boat. Beach working equipment would also be required, including bulldozers, temporary lighting, and a temporary trailer. At other potential beach placement sites, equipment could include the same items.

Alternative 1A

This alternative involves a smaller range of construction approaches and therefore requires use of less equipment for project construction. Mobilization for this alternative would require 3 months.

Mid- to small-scale dredging equipment, including a 10- to 24-inch dredge, discharge line (10,000 linear feet), crew boat, temporary dock and launch ramp, crane, front end loader, booster pumps (two minimum and four maximum), discharge barge, tug boat, survey boat, fueling drums, electrical power supply equipment, and a clamshell dredge or long-arm backhoe for rock placement along channels (if needed).

Earthwork would require multiple long-arm backhoes, excavators, large off-road trucks, scrapers, and bulldozers.

The retrofitting of the Coast Highway 101 bridge structure would be the same for Alternative 1A as described for Alternative 1B. Crew size could range from five to 15 workers.

Under Alternative 1A, the majority of material dredged and excavated from the lagoon would be exported offshore to LA-5. Equipment for off-site materials disposal would be focused at Cardiff State Beach and would include ocean- based equipment such as a monobuoy, pipeline, booster pumps, a barge, tug boat, and work boat.

2.10.3 Site Preparation

Site preparation would be initiated during the mobilization period. The project site would be prepared for construction by first surveying and staking the construction area and locations of particular features. Once the project is delineated, “no construction” zones such as sensitive environmental areas would be cordoned off. Specific contractor use areas may also be constructed within identified staging areas, such as laydown pads for staging dredge discharge pipe segments, an electrical power station, and a dredge launch ramp. Installation of a water level control system between the ocean and the lagoon to allow active water level management during dredging activities would also occur, as appropriate. Clear and grub of focused areas of vegetation would also be initiated during site preparation, both onshore and within the lagoon basins.

Alternative 2A

To prepare the site for construction under Alternative 2A, the contractor would create a dredge launch ramp north of the westernmost former sewage pond and place a temporary dock, clear a laydown area, prepare a fueling site, bring a trailer on-site, mobilize the dredge discharge line, install a temporary electrical supply site, clear a parking area, and prepare a project office (trailer). A permanent dredge launch site would be installed at this location to provide for inlet and channel maintenance dredging in the future. The permanent ramp would be approximately 30 feet wide and would likely be constructed of dirt covered with a layer of gravel. Additional scour protection would be incorporated, as needed.

Alternative 1B

As with Alternative 2A, the contractor would create a dredge launch ramp north of the westernmost former sewage pond and place a temporary dock, clear a laydown area, prepare a fueling site, bring a trailer on-site, mobilize the dredge discharge line, install a temporary electrical supply site, clear a parking area, and prepare a project office (trailer). A permanent dredge launch site would be constructed at the north end of the utility road under this alternative to provide for channel maintenance dredging in the future. The permanent ramp would be approximately 30 feet wide and would likely be constructed of dirt covered with a layer of gravel. Additional scour protection along the main channel would likely be required to protect the ramp since it is located where flow velocities are relatively high.

Alternative 1A

For Alternative 1A, the contractor would create a dredge launch ramp at the north end of the utility road to provide for both launching the dredge for construction, as well as for channel maintenance dredging into the future. Similar to 1B, the contractor would also perform other mobilization activities such as clear a laydown area, prepare a fueling site, bring a trailer on-site, mobilize the dredge discharge line, clear a parking area, and prepare a project office (trailer) The permanent ramp would be approximately 30 feet wide and would likely be constructed of dirt covered with a layer of gravel. Additional scour protection along the main channel would likely be required to protect the ramp since it is located where flow velocities are relatively high.

2.10.4 Wet and Dry Construction Methods

Various methods may be employed to construct the project. Construction methods are largely grouped under the two different types: land-based construction "in the dry" and water-based construction "in the wet." Different constraints are associated with each type of construction, so a combination of approaches is anticipated for the SELRP. Wet construction would require flooding areas that can be diked off to provide adequate water depths to float a dredge over portions of the site proposed for shallow dredging. Dry construction in areas with typically wet conditions is difficult due to extremely soft soils that can limit access for equipment with wheels or tracks; thus, dry construction would typically be restricted to areas around the perimeter of the lagoon that can be reached from shore (e.g., within 50 feet of existing disturbed area), adjacent to existing access roads and dry areas, while wet construction would focus on those areas in sensitive habitats that are not proposed for direct grading and the interior of the lagoon basins. A brief description of each construction approach is provided below.

Wet Construction

Wet, or water-based, construction uses equipment in areas inundated during construction. Water-based construction methods can (1) minimize or eliminate site dewatering, and (2) be more environmentally sensitive because construction of access roads and direct grading/compaction of existing habitat areas in the interior of the lagoon are not required. Site dewatering at a lagoon connected to the ocean experiencing daily tides may not be practical. Also, less intrusion onto vegetated areas is required with a dredge compared to land-based equipment (i.e., trucks, earthmovers), which may result in less site damage. Wet construction approaches have specific limitations as well. Since dredges need to float over the area they are accessing, a minimum amount of water depth must be maintained within portions of the lagoon while dredging is occurring. A typical small dredge has a draft (extends below the water surface) of approximately 5 feet. Therefore, to float a dredge over an area, water depth needs to be maintained at approximately 5.5 to 6 feet. In some areas where ultimate depths would exceed 5 feet below grade, normal tidal fluctuations may maintain adequate depth to allow the dredge to work. In areas where ultimate depths would be in less than 5 feet of water, additional water would need to be temporarily impounded in the lagoon to maintain adequate depths for the dredge to work. To achieve sufficient water depth within the lagoon, flooding would occur in specific areas to allow the dredge to make shallow (less than 5-foot) cuts in the lagoon bottom, up to +6 feet NGVD.

Specific constraints would be implemented during wet construction for all alternatives to minimize impacts to sensitive wildlife (e.g., birds). Construction of temporary dikes to create refugia for wildlife during inundation would occur prior to flooding in the central basin to protect habitat throughout construction from both direct impacts associated with grading and/or dredging and indirect impacts due to extended inundation. Flooding in areas designated for inundation as shown in Figures 2-16 and 2-17 would be initiated prior to the breeding season and maintained. Once flooding is allowed to recede, flooding would not be reinitiated in the breeding season. Any area serving as refugia would also be reintroduced to tidal action outside of the breeding season. Additional general project design features have been incorporated into each of the project alternatives that would minimize effects to other resources, such as water quality, as appropriate. The specific measures described above and these more general measures are identified in Table 2-26 at the end of this section.

Wet construction in lagoons typically relies on dredging equipment, such as hydraulic cutterhead suction dredges, long-arm backhoes mounted on barges, drag-lines, clamshell bucket dredges, and barge-mounted fluidizer pumps. It is anticipated that one or more cutterhead section dredges would be used to construct the SELRP, although specific equipment would be determined by the contractor.

Alternative 2A

Flooding under Alternative 2A\ would be required during dredging of the proposed secondary channels as well as low-marsh and mudflat areas in the central basin, east basin, and west basin. Basins could generally be flooded separately to limit concurrent flooding of sensitive species habitats. Flooding in the central basin and west portion of the east basin could last up to 3 months during Phase 1, and 7 months during Phase 2. Flooding of the east basin would also last up to 7 months during Phase 3, and flooding of the west basin would be less than 4.5 months in Phase 4. Dikes would be constructed in multiple locations to limit flooded areas in the central basin and provide wildlife refugia. Flooding in the east basin would be initially limited by the existing CDFW dike that would be left in place until completion of Phase 3, then a dike would likely be placed at the I-5 bridge crossing during Phase 3 east basin dredging.

Wet sandy material from the overdredge pit created in the central basin would primarily be discharged off-site at an approved placement site, while wet silty/clayey material from the remainder of the site would be generally disposed of on-site in the overdredge pit that would be constructed in the central basin. A small amount of sand would be reused at the proposed nesting site in the central basin, and a small quantity of silts/clays could be reused on-site for construction of man-made transitional areas. Some material could also be used for aggregate during Coast Highway 101 bridge and roadway construction.

Alternative 1B

Flooding under Alternative 1B would also be required during dredging of the proposed secondary channels as well as the low-marsh and mudflat areas in the central basin, east basin, and west basin. The basins would be diked off and flooded separately to limit concurrent flooding of sensitive species habitats, similar to Alternative 2A. Flooding in the central basin and west portion of the east basin could last up to 3 months in Phase 1, and 7 months during Phase 2. Flooding of the east basin could also last up to 7 months during Phase 3, and flooding of the west basin would be less than 4.5 months in Phase 4. Dikes would be constructed to limit flooded areas in the central basin, while flooding in the east basin would initially be limited by the existing CDFW dike that would be left in place until after Phase 3 is complete. A dike would then be placed at the I-5 bridge crossing during Phase 3 east basin dredging.

Wet sandy material from the overdredge pit created in the central basin would primarily be discharged off-site at an approved placement site, while wet silty/clayey material from the remainder of the site would be generally disposed of on-site in the overdredge pit. A small amount of sand would be reused at the proposed nesting site in the central basin, and a small quantity of silts/clays could be reused on-site for construction of man-made transitional areas.

Alternative 1A

Flooding would not be required under Alternative 1A, which would focus dredging activity in channels within the lagoon that generally exceed 5 feet in depth and do not require additional water to dredge those areas.

As discussed in Section 2.9, Alternative 1A would not provide material of suitable quality for reuse within the littoral zone. As a result, material dredged as part of that alternative would be used either on-site (e.g., 10,000 cy at man-made transitional areas, 35,000 cy of sand at the nesting site) or would be disposed of at LA-5.

Dry Construction

Dry, or land-based construction within lagoons typically uses earthmoving equipment accessing a site from the beach, shore, or access roads into the site. For all alternatives, the SELRP envisions only a modest amount of dry construction compared to wet construction. Due to the sensitive habitat within San Elijo Lagoon and the extremely soft soils, construction of access roads for dry construction would be restricted to the shoreline in the vicinity of existing roads (i.e., utility roads in the central and east basins) or areas proposed for grading. Dry construction would likely include clearing tules and other emergent aquatic vegetative growth along the edges of the central and east basins to prepare the site for dredging, and excavation under Coast Highway 101 for the proposed tidal inlet.

2.10.5 SITE ACCESS AND STAGING AREAS

Site Access

The access points for each alternative, illustrated in Figure 2-15, are generally sited at existing access points and existing disturbed areas. According to basin, the general anticipated access points include:

- west basin – off Coast Highway 101, both north and southbound lanes
- central basin – from the north end of North Rios Avenue in Solana Beach to the on-site utility road at the south side of the lagoon, and from Manchester Avenue at the north side of the lagoon
- east basin – from the north end of Santa Ynez Street in Solana Beach to the on-site utility road at the south side of the lagoon, and from Manchester Avenue at the north side of the lagoon

Larger pieces of equipment, such as dredges, may be transported to the site on trucks during the late evening to early morning hours (between 9 p.m. and 6 a.m.) to minimize potential traffic disruption. The inlet and Coast Highway 101 bridge construction equipment and materials are anticipated to arrive via I-5 to Coast Highway 101.

The access road from North Rios Avenue in Solana Beach to the central basin utility road would require some vegetation clearing, grading, and fill with earth and gravel to widen the road to accommodate construction and maintenance vehicles and equipment. Road improvements would occur on both sides of the hillside access road, resulting in less than 5,000 cy of earth moved. Improvements may also occur lower along the access road and may require up to an estimated 10,000 cy of gravel. The road would require periodic maintenance and dust control by the contractor throughout construction, and would retain improvements after construction.

A permanent access and staging pad is proposed along Manchester Avenue in the central basin. This site would be constructed by importing 5,000 cy of earth from off-site and would be used for construction purposes and for permanent access and maintenance.

Temporary staging and stockpile areas would be returned to pre-construction conditions after the completion of construction. Photographs of the site would be taken and wetland vegetation would be mapped prior to construction. Permanent access and staging areas would remain in place after construction to allow for periodic maintenance and adaptive management activities.

During construction, protection of existing utilities and public safety would occur. A pre-construction survey, mapping of utility lines, mobilization of land-based equipment, and construction of access routes and staging areas for the project would be completed under each of the alternatives. Public safety protection measures would be incorporated, including the use of barriers, signs, flagmen, and fences where applicable. Temporary lighting may also be required during nighttime activities such as dredging and materials delivery. Lighting would be downshielded to minimize light spillover into adjacent habitat and residential areas. These measures are identified in Table 2-26 and would be implemented throughout the construction period, as appropriate, to protect public safety within the lagoon and materials placement/disposal sites.

Specific site information is provided in Table 2-25. This table also provides information on which alternatives are anticipated to require use of each of the different sites. Alternative 2A would utilize all of the proposed access points shown in Figure 2-15, while Alternative 1B would utilize all sites except site 4, and Alternative 1A would not use sites 6, 4, or 2.

Alternative 2A would also require removal and relocation of one pole supporting overhead power lines located directly east of the existing railroad track. Alternative 1B and Alternative 1A would not require the removal of utility poles.

Table 2-25
Staging Areas

Staging Area ID No.	Description	2A	1B	1A
West Basin - Accessed from Coast Highway 101				
1	This beach staging area is required to stockpile and distribute construction materials onto Cardiff State Beach for all alternatives. Disposing of materials to the nearshore zone via hydraulic dredge would require electric power at this location for a temporary booster station needed for conveying the slurry material between the lagoon and the ocean. This staging area would also provide access for a backhoe or a bucket and a crane to mechanically excavate the inlet channel to the desired contours. Dredge discharge pipe may also be staged at this location, as well as quarry stone for the cobble blocking features (CBFs) and internal revetments. All alternatives would station a booster pump at this site for the entire duration of dredging sand from the lagoon to the ocean. • Alternative 2A would use the site to store dredge pipe before and after dredging, for a period of approximately 2 months total. Earthmoving equipment would also be staged on this site intermittently over the project construction period. Rock for CBF materials would be staged on this site for approximately 2 months. • Alternative 1B would use the site to store dredge pipe before and after dredging, for a period of approximately 2 months total.	X	X	X

Staging Area ID No.	Description	2A	1B	1A
	Earthmoving equipment would also be staged on this site intermittently over the project construction period. Rock for revetment materials would be staged on this site for approximately 2 months. • Alternative 1A would use the site to store dredge pipe before and after dredging, for a period of approximately 1 month. Rock for revetment materials would be staged on this site for approximately 2 months.			
2	This tidal inlet staging area (Alternative 2A and Alternative 1B) is also suitable for the same equipment and materials to be staged at site 1. This site could also serve as the transition point for an onshore pipeline discharging material to extend offshore to a discharge pipe or monobuoy.	X	X	
3	The existing tidal inlet channel staging area is suitable for quarry stone for the CBFs and internal revetments.	X	X	X
4	The sedimentation basin staging area (Alternative 2A only) is also suitable for the same equipment and materials to be staged at sites 1 and 2.	X		
Central Basin – Accessed from North Rios Avenue and from Manchester Avenue				
5	The former sewage ponds staging area is suitable for the same equipment and materials to be staged at sites 1 and 2. This staging area may be the best location to assemble the dredge due to its relatively large footprint. A small power panel and a dredge launch site would be constructed at the north end of the westernmost former pond. This would facilitate use of an electric dredge and a launch ramp for dredges to construct and maintain the lagoon in the future. This staging area would provide access for assembling and launching dredges from trucked-in components, and would include a yard fuel supply, parking area, office, dock (or platform to tie up the dredge and/or crew boat), and an access dock with a shore-based crane. Temporary power and water would be provided at this location by accessing existing infrastructure located along the access road. Water could be delivered by truck if there is not a water line already in the vicinity. Overhead power exists near the city sewer pump station and would potentially be tapped into for this project.	X	X	X
6	The existing southern access/overlook point (6) would eventually be filled and raised with lagoon material to create a transitional habitat area and, therefore, would be highly disturbed. As such, during construction this site can be leveled and used to stage various types of equipment and materials.	X	X	
7	The site along Manchester Avenue is directly across from the onramp to Interstate 5 south and is suitable for access and staging for clearing and grubbing, and for various pieces of equipment and materials.	X	X	X
East Basin – Accessed from Santa Ynez Street and Manchester Avenue:				
8	The existing utility access road would be available for staging certain equipment and materials that can fit onto the narrow and long surface. This site is only conditionally available if work on the I-5 bridge replacement project has not been initiated or has already been completed. Shared access may also be appropriate as part of the coordinated CM/GC approach anticipated for implementation of the SELRP.	X	X	X
9	The existing dike would be used for staging certain equipment and materials that can also fit onto the narrow and long surface.	X	X	X
10	The existing frontage road near Mira Costa College would be used for staging equipment and materials that can be transported to the lagoon as needed.	X	X	X

Staging Areas and Parking

Potential staging areas for construction access to the project site and storage of equipment and materials are shown in Figure 2-15, and Table 2-25 indicates which sites would be used for each alternative. Each site is identified in the figure by number, corresponding to the discussion in Table 2-25. It is anticipated that construction of the project would require a minimum of two staging areas to serve each lagoon basin, as shown, with the possibility of optional areas depending upon the alternative grading/dredge plans selected for construction.

Daily traffic would consist of personal vehicles owned by construction and construction management personnel, various inspectors, and other representatives from the various agencies and property owners involved with the project (a maximum of 20–40 people per day). Potential parking areas have been identified, including:

- San Elijo State Beach parking lot
- Coast Highway 101 south of the Chart House
- Old sewage basin staging area (within the lagoon)
- Frontage road by Mira Costa College
- Via Pico
- Farin property along Manchester Avenue
- I-5 off-ramp lot
- I-5 and LOSSAN shared right-of-way (ROW) areas
- Cardiff State Beach parking lot

It is anticipated that workers may park at various approved parking areas and then be shuttled to their positions on-site. The contractor would obtain permission or authorization as necessary.

The contractor would contact the appropriate local agency to obtain water and power supplies. Power would be supplied by temporary tie-ins to the existing SDG&E lines and uses would range from power for the construction trailer to power for the dredge. Water would be supplied via temporary connections from the closest water district to each laydown area, which could include the Olivenhain Municipal Water District or San Dieguito Water District.

2.10.6 Clear and Grub of Vegetation

Prior to dredging and grading, specific areas would be cleared of vegetation and the uppermost soil layer in a process called clear and grub. Clear and grub activities would generally occur at areas to be excavated and graded using earthmoving equipment, where accessible. This material would be exported from the site using trucks hauling it along access roads to disposal sites such as the Miramar Landfill. Clearing of vegetation may also be needed at open water areas proposed for dredging that are filled with high-profile emergent aquatic vegetative growth. This material may be cleared using a backhoe mounted on a barge that removes the material and places it into a second barge. The second barge would transport the material to the shore, then would travel back to the clear and grub site. Vegetation removed would be offloaded along the shore and then hauled to a disposal area off-site. Site 7 along Manchester Avenue west of I-5 would be used for off-loading vegetation removed from the lagoon. Some material may require drying at stockpile sites (staging areas) prior to being hauled off-site. Approximately 365,000 cy of material is anticipated to be removed from the site during clear and grub activities, with 85,000 cy removed from the central basin (60,000 cy from the channel areas and 25,000 cy from the overdredge pit), 270,000 cy from the east basin (240,000 cy from the area west of the existing CDFW dike, and 30,000 cy from the area east of the dike), and 10,000 cy from the west basin. While the majority of vegetation and soil material removed during this clearing process is anticipated to be trucked off-site to a landfill, limited stockpiling of topsoil may occur to cap graded areas proposed to be restored with wetland habitats. In addition, mulching of some "green waste" may occur to allow on-site reuse as appropriate and to reduce off-site hauling. Any clear and grub of sensitive habitat would be restricted to outside the bird breeding season, as identified in Table 2-26.

2.10.7 Transitional Areas/On-site Fill

Each of the project alternatives proposes the use of dredge material on-site for the construction of man-made transitional areas and as fill (e.g., nesting area). Transitional areas would be constructed in various locations within the lagoon basins to augment the existing band of habitat surrounding the lagoon and provide additional refugia to species under future sea level rise. Material for creating transitional areas would be pumped into the east side of the former sewage pond (e.g., proposed nesting area) to dewater. Material would be drained, dried, and stockpiled for subsequent use. The capacity of the former sewage pond at any one time is approximately 30,000 cy of material. In addition, a portion of this material may be used temporarily to create the dikes used for the refugia areas.

Alternative 2A

The capacity of the former sewage pond is sufficient to provide material for Coast Highway 101 (approximately 10,000 cy) and more than half of the volume for the proposed transitional habitat areas (total needed quantity is 35,000 cy in the central basin). This material would be provided during Phase 1 or 2 dredging. The remaining 10,000 cy volume needed for the transitional areas would be provided by a second period of dewatering during Phase 2 or 3 dredging.

Transitional habitat areas would be constructed by either hauling or barging material (depending on their location) from the dewatering site. Two of the three transitional areas to be constructed are located adjacent to the access/utility road extending from the north end of North Rios Avenue down into the lagoon from the south. These two sites, one located along the south edge of the central basin, and one in the northwest portion of the central basin, can be accessed by truck or barge. For work within the northern part of the central basin, work would be timed to be done prior to creation of the subtidal area connecting the central and west basins under the rail line, because the utility road would be eliminated at that stage of construction. Finish grading may be done at this site using bulldozers. The third transitional area is located in the southern portion of the central basin but is surrounded by habitat, and would be accessed by water using a barge and crane to place material in the central basin.

Alternative 1B

As described for Alternative 2A, wet material would be dewatered and staged at the former eastern sewage pond site. This site would stage fill for the transitional areas in two phases, as described above. Construction of transitional areas would be similar to Alternative 2A, as described above. Transitional areas under Alternative 1B could be filled at any time during construction, however, since the utility road would remain through completion of the project.

Alternative 1A

Alternative 1A would involve much less material dewatering and rehandling due to its limited extent of change to the existing lagoon. Only 10,000 cy of material would need to be dewatered and hauled to the proposed transitional area in the northwest portion of the central basin. Only a single dewatering phase is needed, and conveyance could occur by truck along the utility road.

2.10.8 NESTING AREA

After utilizing the former sewage pond as a dewatering basin for dredged material, it would be finished as a nesting area for sensitive birds under each of the alternatives. Sand would be used to fill the eastern half of the former sewage pond up to an elevation of +13 feet NGVD to create the 2-acre nesting site, which would then be topped with crushed shell. Material would be allowed to drain and dry sufficiently for earthmoving to occur using bulldozers to sculpt the site to the appropriate template for use by birds. This site would take up to 35,000 cy of sand to reach its final grade.

Alternative 2A

To build the nest site, sand would be dredged from the west basin and either pumped in from the dredge or driven by truck to the site from Solana Beach.

Alternative 1B

At the end of dredging for restoration, sand would be dredged from the tidal inlet channel and either pumped or driven by truck to the nest site for its creation.

Alternative 1A

Sand dredged from the tidal inlet channel would be either pumped to the nest site or driven by truck to the site and placed.

2.10.9 Channel and Bridge Structure Armoring

Each of the alternatives would increase channel cross sections under existing and/or proposed bridge structures. These structures, as well as adjacent channel banks, would require protection using riprap and/or articulated block mats. Access areas for periodic maintenance into the future would also require protection, depending on their location in the lagoon (e.g., permanent dredge launch ramp and access sites along Manchester Avenue).

Riprap would "wrap" around the base of each abutment and extend at least 100 feet upstream and downstream from each abutment. Some reaches near bridges have existing riprap that would be left in place and integrated into new riprap to provide a continuous reach of shore protection under each bridge. The riprap stone would be approximately 1- to 2-ton stone approximately 3 feet in diameter. Riprap exposed to the ocean would need to be larger, approximately 4 feet in diameter, due to larger forces in the ocean. Riprap would be brought to the site by truck and lifted into place using a crane with a long reach. It is anticipated that riprap would be stockpiled at various sites around the lagoon, including sites 1 and 3.

Alternative 2A

Existing structures to remain in place under Alternative 2A include the existing railroad crossing, although an additional railroad bridge would be constructed by others farther south to span the new inlet location. Other existing infrastructure proposed to be replaced/modified by others (I-5 and railroad) would incorporate appropriate protection into design, based on the owners' design standards. As part of the project, the SELRP would construct a Coast Highway 101 bridge structure farther south than the existing crossing to span the new proposed inlet location. This structure would incorporate appropriate scour protection into design as well. The existing railroad crossing would not require additional riprap protection. The permanent dredge launch ramp proposed just north of the nesting area and permanent sites identified for periodic future maintenance access would also require protection. Approximately 60,000 cy of riprap or other protection would be required under Alternative 2A.

Alternative 1B

Alternative 1B would retain the existing lagoon inlet location, and the channel extending between Coast Highway 101 and the railroad bridge would require protection. This measure is to protect the channel from erosion due to higher tidal flow velocities caused by the increased tidal prism. Armor stone would be stockpiled and used by the contractor to armor the existing tidal inlet channel during construction. Riprap armor stone would be placed along the west sides of the existing tidal inlet channel from Coast Highway 101 (existing protection along the east side would remain in place). The existing railroad crossing and proposed dredge launch ramp would also require additional riprap protection along the main channel. Permanent sites identified for periodic future maintenance access would also be protected. In addition, protection for the two proposed footbridges and foot path in the northwest portion of the central basin would be required. Alternative 1B would require approximately 60,000 cy of riprap.

Alternative 1A

Alternative 1A would retain the existing lagoon inlet, and the channel extending between Coast Highway 101 and the railroad bridge would require protection similar to Alternative 1B. The existing railroad crossing and proposed dredge launch ramp would also require additional riprap protection along the main channel. Permanent sites identified for periodic future maintenance access would also be protected. Overall, approximately 60,000 cy of riprap would be required for Alternative 1A.

2.10.10 COAST HIGHWAY 101 BRIDGE CONSTRUCTION OR RETROFIT

Alternative 2A

Under Alternative 2A, a new Coast Highway 101 bridge would be constructed over the new inlet as described below.

Coast Highway 101 Construction Activities and Schedule

Construction on Coast Highway 101 associated with Alternative 2A would be initiated in Phase 1 and would last approximately 18 months. The Coast Highway 101 bridge construction detour and bridgework would occur concurrently with dredging of the central basin during Phase 1, including placement of bank protection around new bridge abutments and the fill supporting the new highway alignment and bed scour protection under the proposed bridge (all likely to consist of rock revetment material). Figure 2-5 illustrates the proposed construction approach for the new bridge structure. Work on the west and east halves of the roadway would be conducted sequentially. After the temporary detour is constructed, demolition and pile installation would commence on the other half of the existing Coast Highway 101. The remaining half of the new bridge would be constructed, followed by a final joint pour between the two deck structures.

The new bridge would be built sufficiently high to provide for the appropriate elevation to clear potential storm and tide water levels. Adjacent stretches of the highway would be raised substantially to transition to the higher bridge structure, as shown in Figure 2-5. The highway approaches to the new bridge would be 6 to 8 feet higher than the existing highway at those locations. Approximately 10,000 cy of fill would be required to build the bridge approaches.

Access between the staging area (site 5 in Figure 2-15) and Coast Highway 101 would occur via a haul road extending between the dredge launch site (near the former sewage pond) through the proposed subtidal basin footprint and under a new LOSSAN railroad bridge location to Coast Highway 101. This assumes that the LOSSAN railroad double-tracking project would occur concurrently, as has been indicated by SANDAG in project coordination meetings. The haul road would pass under the new proposed rail bridge and through the west basin to Coast Highway 101. The southern portion of the west basin may need to be closed to the tide at this point (at low tide, leaving the basin relatively dry and still providing refugia for species during flooding in other basins). A dike could be constructed toward the south end of the basin, or the haul road itself could serve as a dike preventing water flow to the southern end of the basin (dike 7 in Figure 2-15). Close coordination with the rail bridge contractor would be required throughout this phase of the project. The portion of the existing Coast Highway 101 roadway within the bridge construction area not open to travel would be demolished and pavement processed into aggregate and reused for road base and asphalt. Remaining construction of the Coast Highway 101 bridge and bridge approaches would occur in Phases 2 and 3. Construction of the new Coast Highway 101 bridge structure would be completed before opening the new tidal inlet, and work would be completed using dry construction techniques. The existing Coast Highway 101 bridge would remain.

Traffic Modifications during Coast Highway 101 Construction Activities

All traffic would be detoured onto a temporary surface of the road on one-half (two lanes) of the existing Coast Highway 101 bridge. One side of the new bridge would be constructed and poured first, while traffic would use the other half of existing Coast Highway 101 to maintain continual access in both directions. Once one side of the new bridge is completed, traffic would then be shifted to the side of Coast Highway 101 with the new bridge while the remaining half of the new bridge would be constructed.

Alternative 1B

Under Alternative 1B, the existing Coast Highway 101 bridge would be retrofitted to increase its seismic stability.

Coast Highway 101 Retrofit Activities and Schedule

Retrofitting of the existing bridge along Coast Highway 101 would be implemented by others and would last approximately 8 months. This work could occur at any point during the restoration project construction period prior to clearing of the tidal inlet channel (anticipated to be a Phase 4 action), so the contractor may choose to delay initiating work along the roadway to another phase. The work would necessitate managing the tidal inlet location to allow retrofit work to be done in dry conditions. Retrofit work would likely be phased and would be completed under one-half of the existing bridge length (e.g., either the south or north end) while the tidal inlet channel is maintained in position under the other half of the existing bridge. When first phase work is complete, the tidal inlet channel would be moved under the other half of the existing bridge (with the completed retrofit) and the second phase of retrofit work would be completed. Construction would begin with mobilization of equipment and materials, followed by construction of CIDH piles, construction of pile caps, and construction of pier walls. Anticipated retrofit work is described below.

A large-diameter concrete shaft (CIDH pile) would be constructed at the ends of each bridge pier and connected to the existing bridge with a concrete grade beam or pile cap. Existing piles not yet been encased in shotcrete would be encased. New shafts would be designed for seismic loads and embedded into competent material by drilling below the loose surficial soils, which are susceptible to liquefaction. The CIDH piles are anticipated to be approximately 5 feet in diameter and 100 feet deep. If existing piles were to fail through shear, or to lose vertical capacity through liquefaction of the soil, the new piles would support the dead load of the bridge and prevent the bridge from collapsing. The above repairs would correct the existing seismic deficiencies of the structure. It is anticipated the work would be done using dry construction approaches with equipment such as cranes and loaders.

Traffic Modifications During Coast Highway 101 Retrofit Activities

It is anticipated that the CIDH piles would be constructed using a 100-ton crane positioned on the existing bridge deck. This would necessitate closing half the bridge to traffic 24 hours per day for approximately 3 months and traffic detours would be required. For instance, the easterly two lanes would be closed as the CIDH piles on that side were installed, and the two westerly lanes would stay open to two-way traffic. Once the easterly piles were installed, traffic would be moved to the easterly lanes and the operation would move to the westerly side of the bridge. It is anticipated some additional complete night closures and detour of traffic would occur for the installation of the rebar cage for the piles. Remaining work would be accomplished from under the bridge.

Alternative 1A

Under Alternative 1A, the existing Coast Highway 101 bridge would be retrofitted to increase its seismic stability, using the same approach as described above for Alternative 1B.

2.10.11 Opening the Tidal Inlet

Under all alternatives, the existing or new inlet would be addressed as one of the final construction activities. Various methods can be used to open a new inlet, or to expand and enlarge the existing inlet. The method proposed for each individual alternative is described below.

Alternative 2A

The new inlet associated with Alternative 2A would be excavated and opened "in the dry." A typical approach is to erect and maintain a dike separating the inlet from the sea, and work behind the dike with earthmoving equipment to excavate the channel and install bed and bank protection (stone). Once components are installed, the dike at the beach is breached with a backhoe from shore at low tide and the site is allowed to flood on the next incoming tide.

Alternative 1B

The existing inlet would be expanded and enlarged using the same approach that the SELC presently uses to maintain the inlet. This approach is to dike off the inlet and install a temporary construction road between the internal inlet channel and the beach and a working platform along the internal inlet channel. A backhoe sits on the working platform and excavates sand from the channel and drops it into trucks that carry it to the beach for dumping. The working platform is progressively moved along the length of the inlet channel to enable clearing of the entire channel length.

Alternative 1A

Opening the tidal inlet would be identical to the description provided for Alternative 1B.

2.10.12 Inlet, Basin, and Channel Maintenance Activities

Maintenance activities would require future access for equipment and personnel to areas also delineated in Figures 2-12 through 2-14. Intermittent access, maintenance, and staging areas include needed launch facilities for dredge equipment, staging for equipment, and roadways to access these areas. Some additional maintenance in channels may occur very infrequently (every 10 years) and in focused locations subject to sedimentation, vegetation encroachment, or other adaptive management needs.

Alternative 2A

Maintenance of the sediment basin and inlet would be conducted by dredging. A 10- to 24-inch dredge would be mobilized from the proposed permanent dredge launch ramp near the nesting site, and moved throughout the sedimentation basin to remove sand. Approximately 300,000 cy is anticipated to be dredged from the basin approximately every 3 years, and the material placed on Cardiff Beach south of the tidal inlet. Placement would occur by allowing sand to flow out of the end of the discharge pipe above the mean high tide line (+2 feet NGVD) and below the elevation of the beach berm (+12 feet NGVD). Sand would be conveyed to the beach while waves and tides rework and disperse it, thereby "feeding" the littoral cell. This approach is similar to that employed at Batiquitos Lagoon in 2011 and Bolsa Chica in 2009. Conveyance would occur using a 10- to 24-inch-diameter high-density polyethylene (HDPE) pipe from the dredge to the beach. A temporary electrical power site similar to that discussed for construction may be placed on-site during maintenance activities; no booster pumps would be required. The work may require up to 5 months for completion.

Additional channel maintenance may be required in some of the main and secondary channels, depending on sedimentation and vegetation growth. This type of activity is anticipated to be required approximately every 10 years. For channel maintenance, it is anticipated that a smaller dredge or barge would utilize the dredge launch ramp to access channels through the sedimentation basin, and then remove sediment or vegetation from focused areas. Depending on the quality of sediment removed, it may be placed on Cardiff Beach (in a process similar to that described above) or dewatered and transported off-site to a landfill. Similarly, vegetation removed during channel maintenance would be disposed of off-site. Material identified for off-site disposal would be transported to shore access locations along Manchester Avenue (for the west, central and east basins) and trucked to I-5 and the designated disposal site. For these activities, a temporary electrical power site similar to that discussed for construction may also be placed on-site.

Alternative 1B

Alternative 1B would require annual inlet maintenance using the same approach as existing conditions. That approach uses earthmoving equipment to clear the existing tidal inlet channel from Coast Highway 101 to approximately the location of Kai’s Restaurant, near the location of the first channel bend (west of the railroad line). The contractor would use off-road rear dump trunks, a bulldozer, and a large backhoe to complete the work. As explained above, the contractor would dike off the inlet channel under Coast Highway 101 with a bulldozer to prevent tidal inundation during the channel excavation, and dig a low road under the existing bridge for trucks to drive beneath (the height of the trucks is sufficient to warrant lowering the sand surface under the bridge to provide sufficient clearance). The bulldozer would also be used to build the following:

- a temporary haul road within the inlet channel along Coast Highway 101 that trucks can use to access the backhoe; and
- a sand pad working platform for the backhoe in the channel along Coast Highway 101 that sits above the tide.

The backhoe would work from the pad to dig sand from the channel. The backhoe operator would swivel the backhoe toward Coast Highway 101 and place several bucketfuls of sand in the rear of a dump truck. The truck would then drive north and under the Coast Highway 101 bridge to the beach, south of the restaurants, and place the material on the beach. The truck would then drive back to the inlet channel for another load. This cycle would be repeated with several trucks (approximately three) in a queue. The working pad for the backhoe would progressively move upstream in the inlet channel as the excavation proceeds until it reached its most upstream point. The bulldozer would continually maintain the sand berm across the inlet, the road under the Coast Highway 101 bridge, and the backhoe’s working pad during the operation. Approximately 40,000 cy is anticipated to be removed during each annual inlet maintenance cycle, which would require approximately 4 weeks to complete.

Additional channel maintenance may be required in some of the main and secondary channels, depending on sedimentation and vegetation growth, in a manner similar to that described for Alternative 2A. A temporary electrical power site similar to that discussed for construction may be placed on-site during maintenance dredging activities.

Alternative 1A

Alternative 1A would require annual maintenance of the inlet, similar to Alternative 1B. It is anticipated that less material would be excavated with each maintenance cycle. Under Alternative 1A, approximately 35,000 cy is anticipated to be removed during each annual inlet maintenance cycle, which would require approximately 3 weeks to complete.

Additional channel maintenance may also be required in the main channel under Alternative 1A, depending on sedimentation and vegetation growth, in a manner similar to that described for Alternative 2A.

2.10.13 Revegetation and Restoration of Habitat

After dredging and filling is complete within each basin of the lagoon, recovery of disturbed areas would begin. It is anticipated that, to attain the post-restoration habitat distribution shown in Figures 2-3, 2-9, and 2-10, a combination of natural recruitment and targeted planting would occur. Some wetland habitats are relatively easy to establish through natural recruitment if areas are created at specific elevations and inundation frequencies (e.g., pickleweed/mid-marsh). Other habitat types, such as low-marsh and transitional habitats, do not establish as quickly, and may need to be supplemented with focused planting efforts. Post-restoration habitat distributions are shown in Table 2-17.

A comprehensive restoration plan would be prepared for San Elijo Lagoon once an alternative has been selected. The restoration plan would include plant and soil salvage plans, planting plans, natural recruitment expectations for wetland habitats, measures to promote sensitive species recruitment (wildlife and plant species), quantitative and qualitative success standards, remedial measures, and annual monitoring requirements. Monitoring is expected to include sediment and water quality sampling, as well as a range of biological analysis (e.g., algal, invertebrate, avian, and aquatic species surveys). The restoration plan would be implemented for a minimum of 5 years or until success criteria are met. Following the 5- to 10-year construction maintenance period, long-term monitoring and adaptive management of the lagoon would continue. More details on the construction and long-term and adaptive management of the lagoon are discussed in Section 2.11.3, below.

Target habitat communities and land cover types are noted below for each alternative. Detailed performance criteria would depend on the alternative selected and be both qualitative and quantitative. Regardless of the alternative chosen, performance criterion would be established for improved water quality, hydrologic function, and biological resources to ensure that restoration improvements can be measured and triggers for remedial measures and adaptive management are clear.

2.10.14 MATERIALS DISPOSAL FOR CONSTRUCTION ACTIVITIES

Construction Schedule and Phasing

Materials disposal of sediment removed from the lagoon is a critical component of the proposed project but would occur during focused periods of the overall lagoon restoration. Vegetation removed from the lagoon through clear and grub activities would also be required, as described in Section 2.10.6. This section focuses on the export and disposal or reuse of sediments, which can be complex depending on the quality of the material. A SAP has been prepared for the project to characterize sediment within the lagoon, and provides a preliminary conclusion that sediment within the overdredge pit location is suitable for placement on beaches or in the nearshore, or in offshore stockpile sites (Appendix A). Additional characterization will be required once an alternative has been selected for implementation. Depending on the quality of materials to be exported, a number of different disposal and/or reuse scenarios exist. Each of these could involve different methods. For Alternative 2A and Alternative 1B, material would be reused on-site, placed within the littoral zone, or deposited at SO-5/SO-6. Alternative 1A would not produce suitable material for reuse, and material would be disposed of on-site in transition areas or offshore at LA-5. Depending on the locations and methodologies for disposal/reuse, different construction methods could result in varying durations/timing of disposal.

Under Alternative 2A and Alternative 1B, 13 months is required for Phase 1, 7 months each is required for Phases 2 and 3, and 4.5 months is required for Phase 4, to dredge and transport material to offshore areas, the nearshore, nearby beaches, or adjacent construction sites. Some additional constraints on material transport and placement may be imposed during the permitting phase, such as seasonal or special event restrictions for specific area beaches.

For Alternative 1A, disposal could occur over the construction period of up to 9 months and no schedule restrictions are anticipated on disposal activities. These activities would occur as material is excavated from the top layers of sediment in each lagoon basin.

Export and Sediment Transport Operations

If sediment is being discharged outside of the lagoon (e.g., not in transitional or nesting areas), transporting dredged materials to the ocean is necessary. Transport is anticipated to occur through a pipeline extended from the lagoon, through the lagoon inlet, and directly to the placement site (for placement at portions of SO-6, Cardiff nearshore, and Cardiff Beach) or into a waiting barge (for transport of material to SO-5, portions of SO-6, nearby beaches, or LA-5). An offshore mooring would be located at a temporary monobuoy offshore from site 4 (see Figure 2-15) to provide a relatively stable hook-up location for a barge. Once full, the barge would transport materials to offshore disposal sites (LA-5), designated placement sites outside the littoral zone (SO-6 or SO-5), or beaches located up or down the coast. Disposal/placement once the sand has been transported to the site is described below depending on placement approach.

Up to four booster pumps may be necessary to help convey material to the disposal locations through the dredge pipeline. The booster pumps ensure that the dredged material flows through the pipelines with enough speed and energy so that heavier material does not settle out and clog the pipeline. The booster pumps would be temporary and installed at locations along the dredge pipeline. The booster pumps are generally a large engine with the dredge pipeline entering and exiting from each end. Each booster pump is self-contained, typically on top of temporary skids on a wood or metal floor pad. Because the booster pumps are temporary, they do not require a permanent foundation or pad; rather the pumps can be placed on level areas of gravel or dirt, on the beach, or other stable surfaces. If located outside of the secured construction area, such as on the beach, the booster pump equipment would be fenced for security purposes. The booster pumps must be maintained and are typically visited a couple of times per day. Anticipated pipeline and booster pump locations are shown in Figures 2-16 and 2-17.

Offshore Placement

Both the SO-5 and SO-6 borrow sites dredged for the 2001 RBSP or 2012 RBSP remain as depressions approximately 10 to 15 feet below the adjacent seabed. Materials placement could occur within these sites as part of the SELRP for offshore stockpiling of material suitable for reuse within the littoral zone under Alternatives 2A and 1B. The 2012 SO-6 dredge area is close enough to shore (within 4,000 feet) for sand to be discharged directly through a pipeline extended along the ocean floor from the beach south of the existing restaurants. The discharge line would pass from the lagoon through the existing tidal inlet and along the back of the beach to south of the restaurants, then straight offshore into the placement site. Natural ocean forces would distribute material within the placement site depression. The untended seaward end of the pipe could potentially remain in place. Sand would deposit around and over the pipe in a centralized area. The pipe would be pulled out of the site from its landward end by earthmoving equipment at project completion. Alternatively, sand would be pumped from the lagoon through a discharge line to a barge over the discharge site with a downspout, then directed downward into the placement site. Material would exit the barge-mounted downspout near the seabed and settle on the seafloor within the placement site. The barge would be repositioned periodically to spread the discharge evenly through the placement site, and natural forces would complete the distribution.

Nearshore Placement

As part of construction, nearshore placement of beach-quality material would occur off Cardiff State Beach, just outside of the surf zone. As part of Alternative 2A, this placement would be a critical component of providing a stable, prefilled ebb bar adjacent to the relocated inlet. A prefilled ebb bar would provide the material needed for the ultimate equilibrium geomorphic formation and thereby minimize beach erosion in the area (M&N 2011). Nearshore placement under Alternative 1B could also occur to supplement the local littoral sand supply. Placement of material in the nearshore would provide a feeder sand bar for nourishment of the littoral zone as a beneficial material reuse action. The sand in the prefilled ebb bar would act as a reservoir of sand for beach nourishment as the bar disperses slowly over time. An additional purpose of a prefill ebb bar is that it can also serve as a recreational amenity by producing at least a moderate-quality wave, or an even better-quality wave than presently exists for its duration (M&N 2014). Sand placement in the nearshore zone is shown in Figure 2-11 and would consist of pipe placement extending from the lagoon mouth along the ocean floor to the proposed placement location. Material excavated from the lagoon would be directly discharged through that pipeline into the nearshore, and the ebb bar/placement location constructed from the ocean floor up. Alternatively, sand would be pumped from the lagoon through a discharge line to a barge over the discharge site with a downspout, then directed downward into the ebb bar/placement location. Material would exit the barge-mounted downspout near the seabed and settle on the seafloor within the placement location. The barge would be repositioned periodically to spread the discharge evenly, and natural forces would complete the distribution. No beach closure or shore-based activities would occur.

Beach Building

A number of projects have placed sand directly on regional beaches. In fall 2012, SANDAG's RBSP placed sand on eight beaches along the San Diego shoreline from Oceanside to Imperial Beach, including a number of beaches in proximity to San Elijo Lagoon. In 2001, an initial RBSP placed sand on these beaches plus others (total of 12). The sand placement footprints and beach building strategies proposed for the lagoon restoration project would be similar to those utilized for RBSP. Maximum potential beach fill quantities for each beach location are presented in Table 2-20. Generally, beaches would be formed by transporting sand to the monobuoy off Cardiff, loading a barge, and using that barge to convey the material to a specific placement site. Once at the placement or receiver beach, the barge would connect to another temporary monobuoy. Material would be transported back to the placement beach via a discharge pipeline. The Cardiff placement site is close enough to the lagoon source that the material would be conveyed by pipeline only. Booster pumps may be necessary along the pipeline to ensure the material moves quickly enough to avoid settling and clogging of the pipe.

Sand would be discharged through the discharge pipeline to the beach placement site mixed with a high proportion of water as a slurry. Discharged sand would be initially pumped into a training dike constructed to reduce turbidity and aid in the retention of pumped sand (PDF-51). As slurry is discharged from the pipeline, the dike directs the flow of the discharge and slows the velocity of the slurry, thereby allowing more sediment to settle onto the beach instead of remaining in suspension and being transported into the surf zone. Once discharged onto the beach, sand would be allowed to settle from the water/slurry. The sand would then be graded and spread along the beach using bulldozers to create a larger beach footprint of specific dimensions (elevation, width, and slope). Generally, beaches would be constructed to elevations up to +12 feet above MLLW. The post-construction upper slope would be steeper than the pre-construction profile, but would quickly and naturally evolve toward an equilibrium average nearshore slope, which is a function of sediment grain size and wave characteristics. The beach fill would naturally disperse over a wider portion of the beach and nearshore zone, resulting in a flatter profile. Flattening of the slope and adjustment of the beach profile causes reduction of the berm width from the post-construction profile. As the beach is augmented in one segment, the pipeline is extended to a new portion of the beach, where the same sequence of activities occurs.

Beach placement footprints for this project would be the same as those identified for RBSP at Leucadia, Moonlight, Solana Beach, and Torrey Pines.[2] The Cardiff placement site for this project would extend farther north and south of the previous footprint used for RBSP.

On-Site Fill Use

Some excavated material would be used on-site as fill to create the transition areas and underlying the nesting area. This material would be piped or barged through the lagoon and would be placed during construction.

[2] The Torrey Pines site was used as part of 2001 RBSP. As part of 2012 RBSP, the site was evaluated for environmental impacts but not used due to financial reasons.

Offshore Transport to LA-5

Under Alternative 1A, dredged material would not qualify for beneficial reuse (e.g., would be excessively silty or fine-grained). Instead it would be transported to LA-5. This location is one of 12 offshore disposal sites designated by EPA and is located approximately 28 miles southwest of San Elijo Lagoon. This is the closest of the 12 disposal sites to the project. Once material is removed through dredging, it would be transported to a monobuoy temporarily located off the lagoon inlet, then via barge to LA-5. Preliminary coordination with the Corps and EPA indicates the material appears suitable for disposal at LA-5. If Alternative 1A is selected for implementation, additional testing (Tier 3) would be conducted in compliance with the ODM prior to authorization for disposal from the Corps and EPA. Should the materials be determined to be not suitable for disposal at this location, the material would be sequestered on-site in built transition or nesting areas.

2.10.15 Public Safety/Beach, Ocean, and Lagoon Closures

Due to construction activities, limited areas may be temporarily closed to access for public safety reasons. This could include portions of trails within the Reserve. Alternative trail access would remain available throughout construction, however, to maintain public access to the Reserve. Staging and stockpile areas outside of the secured lagoon site, such as beach staging areas, could also be fenced for public safety, as required. These sites could include areas designated for pipe and equipment stockpiling, or maintenance (e.g., washdown or fueling) areas. Such areas may be located around the perimeter of the lagoon or on the beach.

Specific areas of the lagoon, materials placement, and staging/access areas may require temporary lighting to maintain public safety as well. Lighting would be provided during nighttime construction activities such as dredging, placement of dredged materials, and nighttime deliveries. There may also be focused areas requiring lighting to maintain security, such as staging areas outside the larger lagoon site. Night lighting would be limited to those areas required for safety, directed downward, and shielded to minimize light spillover into adjacent areas of sensitive habitat and/or residential development.

For beach placement sites, portions of the beach directly affected by active replenishment and construction activities may be closed temporarily. Adjacent stretches of beach not directly affected by placement activities, such as those areas through which pipeline may extend but where sand is not directly being placed, would remain open to public access and recreational activities. Depending on the beach site and material excavation rates, up to 500 feet of beach may be closed per day in a specific location. As sand placement activities shift along the beach, those areas in which sand placement has been completed would be reopened to public use.

Horizontal access along the back beach would be maintained, with temporary closures occurring as necessary to complete sand placement to the back edge of the beach, particularly where no alternative horizontal access exists (e.g., where a wet beach abuts bluffs). Ocean areas directly adjacent to sand transport/placement equipment and activities may also be temporarily closed to ensure public safety. Buffers around temporary monobuoys and ocean placement sites would be maintained to avoid water recreation users and vehicle safety hazards. Each of these measures is described in Table 2-26.

As part of sand placement on the beach, the SELC would be in consistent communication with local jurisdictions and safety agencies (e.g., lifeguards) to ensure notification and safety measures are implemented. Additionally, notifications in the local media would be placed to help ensure public awareness of the project and potential construction activities. Additional safety measures are described in Table 2-26.

2.10.16 PROJECT DESIGN FEATURES

The SELRP is a restoration project 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 SELC 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 restoration 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 in order 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 features are summarized in Table 2-26 and include the purpose, timing, and responsibility for implementation of each project design feature.

Table 2-26
Summary of Project Design Features/Monitoring Commitments and Minimization Measures

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
		General				
PDF-1	PDF-1	Implement a public information program to assist nearby residents in understanding the purpose of the project and disseminate pertinent project information.	Reduce impacts related to land use incompatibilities.	Prior to and during construction	SELC	All
PDF-2	PDF-2	Maintain project website with current construction schedule.	Ensure timely public notification; minimize land use conflicts.	During construction	SELC	All
PDF-3	PDF-3	Conduct fueling and/or maintenance activities at designated staging areas and designated fueling areas, and prepare a Spill Prevention, Control, and Countermeasure plan for hazardous spill containment.	Minimize safety hazards associated with release of hazardous materials.	During construction/ Maintenance	Contractor	All
PDF-4	PDF-4	Stake construction areas and no construction zones. Limit construction equipment and vehicles to within these limits of disturbance.	Protect sensitive habitat areas; reduce public safety hazards.	During construction/ Maintenance	Contractor	All
PDF-5	PDF-5	Restrict access to portions of lagoon trails and beaches to maintain public safety.	Reduce risks to public health and safety.	During construction/ Maintenance	Contractor	All
PDF-6	PDF-6	Maintain alternative access to beaches adjacent to placement sites, portions of trails not under active construction, and the Nature Center.	Minimize impact on public access.	During construction	Contractor	All
PDF-7	PDF-7	Shield and direct night lighting toward nonsensitive lagoon areas or the ocean and away from residences and habitat.	Minimize effects on residents and sensitive species.	During construction/ Maintenance	Contractor	All
PDF-8	PDF-8	Equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers.	Minimize noise impacts.	During construction/ Maintenance	Contractor	All
PDF-9	PDF-9	House exposed engines on dredging equipment to the greatest extent possible.	Minimize noise impacts.	During construction/ Maintenance	Contractor	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-10	PDF-10	Contractors will maintain equipment and vehicle engines in good condition and properly tuned per manufacturers' specifications. Idling time for construction equipment will be minimized, as appropriate.	Minimize air quality impacts and greenhouse gas (GHG) emissions.	During construction/ Maintenance	Contractor	All
PDF-11	PDF-11	All storage, handling, transport, emission, and disposal of hazardous materials will be in full compliance with local, state, and federal regulations (Health and Safety Code, Division 20, Chapter 6.95, Article 2, Section 25500-25520)	Avoid impacts associated with hazardous materials.	During construction/ Maintenance	Contractor	All
		Lagoon Restoration				
PDF-12	PDF-12	Utilize continuous construction, with internal phases to (1) restrict vegetation clearing and grubbing to outside the breeding season (February 15–September 15) (2) limit active construction to two basins at a time (excludes construction of Coast Highway 101).	Minimize impacts to sensitive wildlife species and their habitats.	During construction	Contractor	All
PDF-13	PDF-13	Have Biological Monitor, experienced with each of the listed species, on-site during construction; frequency may vary depending upon activity but could be daily during breeding season. If.If California gnatcatcher nests are found and need to be inspected, or if California gnatcatcher calls are required for survey efforts, a Biological Monitor with section 10a1a certification will be used. While clearing and grubbing activities are occurring, walk along the impacted habitat ahead of machinery in an effort to flush the birds and other wildlife.	Confirm implementation of biological permit conditions, design features, mitigation measures, and applicable construction specifications. .	During construction	Qualified biologist	All
PDF-14	PDF-13	Remove sources of impounded water resulting from construction equipment (if any) and confirm compliance with construction specifications regarding no ponding. At the discretion of the Biological Monitor, release	Minimize vector breeding opportunity during construction.	During construction	Qualified biologist/Contract or	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
		water controls during construction as needed to enable tidal exchange and circulation.				
PDF-15	PDF-13	Ensure no encroachment into sensitive “no construction” zones. Visually inspect construction equipment prior to use for evidence of soils or other material that might contain invasive species. Examine equipment history to ascertain if the equipment has been involved in work within areas known to contain invasive species.	Minimize the potential to introduce aquatic invasive species into the site.	During construction	Qualified biologist	All
PDF-16	PDF-14	Prior to initiating construction, identify sensitive “no construction zones” and fence or flag those areas	Minimize impacts to sensitive habitat areas.	Prior to construction/ Maintenance	Qualified biologist/Contractor	All
PDF-17	PDF-16	Initiate flooding of habitat areas outside of the breeding season. If flooding is reduced and required again within the same year, reinitiation of flooding will occur outside the breeding season as well.	Minimize impacts to breeding bird nests and nesting activity.	During construction	Contractor	Alternatives 2A and 1B
PDF-18	PDF-17	Clear and grub activities will occur in sensitive habitats in flooded areas. If clear and grub is required in dry conditions, a qualified biological monitor will walk ahead of the impact area to flush birds and other wildlife if conditions are appropriate and safe.	Minimize impacts to resident bird species and sensitive wildlife species.	During construction	Contractor/Qualified biologist	All
PDF-19	PDF-18	Controlled inundation will be used prior to clearing and grubbing in low- and mid-marsh habitat to actively encourage wildlife to relocate from vegetation to be cleared to adjacent nonimpacted habitat. After at least 24 hours of consistent inundation, grubbing of vegetation within the grading footprint will occur while still inundated to minimize the likelihood of contacting marsh birds.	Minimize impacts to resident marsh bird species.	During construction	Contractor	Alternatives 2A and 1B
PDF-20	PDF-19	Site staging areas and access roads at existing access points and previously disturbed areas, where feasible.	Minimize impacts to intact habitat and reduce site	Final design	Engineer	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
			preparation requirements.			
PDF-21	PDF-20	Prepare a targeted habitat enhancement plan for light-footed Ridgway's rail and Belding's savannah sparrow. Enhancement activities will be identified to minimize impacts to these species during construction. Activities will include fencing, public signage, selective vegetation removal (i.e., invasive species or native species not preferred by Belding's savannah sparrow), nesting platforms, perch removal, predator trapping/control, and other techniques to minimize predation and encourage nesting of the species. The plan will be finalized in conjunction with the permitting and approval process for the project in order to incorporate agency and permit conditions. Due to these timing constraints, final plans will not be completed prior to issuance of the Final EIR/EIS, but will be completed prior to project implementation.	Minimize impacts to light-footed Ridgway's rail and Belding's savannah sparrow.	Final design;	Qualified biologist, with approval of the Corps and County.	All
PDF-22	PDF-20	Implement targeted habitat enhancement plan for light-footed Ridgway's rail and Belding's savannah sparrow, specifically within designated refugia areas and other suitable habitat not directly impacted by construction activities.	Provide refugia and promote nesting by light-footed Ridgway's rail and Belding's savannah sparrow during construction in areas not directly impacted by construction activities.	During construction, prior to impacting suitable habitat areas	Qualified biologist	All
PDF-23		Consult with resource agencies, including USFWS, on final nesting area design during the permitting process.	Encourage nesting of special-status species.	Prior to construction	Qualified biologist	

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-24		Where practicable, invasive species will be removed by hand or hand tools rather than chemical means. When necessary, herbicide application will be conducted by personnel with a California Department of Pesticide Qualified Applicators Certificate (QAC) or by personnel under the supervision of a person with a California Department of Pesticide Qualified Applicators License (QAL). All herbicide applied will be consistent with the label, as well as state and local regulations. Any herbicide used will be approved for use in an aquatic environment (i.e., AquaNeat®) as the entire restoration area is within the confines of the lagoon. Herbicide application will be conducted using backpack sprayers and will consist of spot spraying nonnative plant species. Herbicide application will be conducted using methods that limit overspray to adjacent native plant species and will be discontinued when wind speeds are higher than the designated label standard or above 10 miles per hour.	Reduce overspray and drift of herbicides to nontargeted species and areas.	During and after construction	Contractor	All
PDF-25	PDF-21	Prepare a Storm Water Pollution Prevention Plan (SWPPP). Prepare a Storm Water Management Plan (SWMP), a Hydromodification Management Plan (HMP), and Low Impact Development (LID) best management practices in compliance with the County MS4 Permit. The SWPPP and SWMP must be approved by the County and City of Encinitas as appropriate prior to approval of associated grading plans to confirm that the limits of disturbance will be maintained within the identified footprint.	Prevent pollutant discharge.	Prior to construction	Prepared by QSD certified Contractor	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-26		Implement best management practices in compliance with SWPPP, SWMP, HMP and LID.	Prevent pollutant discharge.	During construction and future maintenance activities	QSP certified Contractor on-site	All
PDF-27	PDF-22	Actively manage turbidity by using a cutterhead dredge and/or temporarily closing the lagoon inlet.	Minimize release of disturbed sediment to the coast.	During construction	Contractor	Alternatives 2A and 1B
PDF-28		Cap overdredge pit with sand material to encapsulate material and prevent it from being introduced into the water column or released into the environment.	Minimize sedimentation, turbidity, and potential release of contaminants.	During construction	Contractor	Alternatives 2A and 1B
PDF-29	PDF-23	Coordinate with the utility service provider for relocating and/or avoiding utilities infrastructure.	Reduce and/or avoid impacts to existing utilities infrastructure.	Prior to construction	SELC and Contractor	All
PDF-30	PDF-24	Coordinate with affected utility service provider in the event relocation is required or if maintenance needs for agency-owned structures are identified during SELRP monitoring activities.	Minimize utility service disruptions.	During construction/ Maintenance	Contractor	Alternative 2A
PDF-31	PDF-25	Near Solana Beach sewer pipe or other utilities to be left in place, require dredging and excavation activities to stay above the minimum cover required by the utilities' owner.	Avoid impacts to existing utilities and infrastructure.	Prior to and during construction	Contractor	Alternatives 2A and 1B
PDF-32		Coordinate with NCTD regarding phasing and timing to minimize impacts to the railroad during construction.	Avoid impacts to existing utilities and infrastructure.	Prior to and during construction	Contractor	Alternatives 2A and 1B
PDF-33	PDF-26	Equipment fueling and maintenance will occur at the designated staging areas and designated fueling areas away from publicly accessible areas.	Ensure public safety.	During construction/ Maintenance	Contractor	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-34	PDF-27	During off working hours, secure heavy equipment and vehicles in staging area.	Ensure public safety.	During construction/ Maintenance	Contractor	All
PDF-35	PDF-28	Provide fire suppression equipment on board equipment and at the worksite.	Reduce fire hazard risks.	During construction/ Maintenance	Contractor	All
PDF-36	PDF-29	Require heavy equipment operators to be trained in appropriate responses to accidental fires.	Reduce fire hazard risks.	During construction/ Maintenance	Contractor	All
PDF-37	PDF-30	Design recommendations from the San Diego Association of Governments (SANDAG) Sea Level Rise Study (SANDAG 2013) will be incorporated into pile foundation and abutment protection engineering for bridgework.	Ensure structural integrity of proposed structures.	Prior to construction	Engineer	Alternative 2A
PDF-38	PDF-31	The new bridges at the railroad and at Coast Highway 101 under Alternative 2A 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 structural integrity of proposed structures.	Prior to and during construction	Engineer, Contractor, and SELC	Alternative 2A
PDF-39		Channel bank and bridge abutment protection will be installed along the inlet channel and at bridge crossings (Coast Highway 101, NCTD railroad, and I-5) to protect channels and structures from erosion during severe storm flow events. Rock armoring will be placed directly along the toe of bridge abutments and will “wrap” around the end of the earthen berms supporting each bridge. Bridge protection will be designed in accordance with design standards of bridge owners (and placed as part of new bridge structures, as applicable).	Minimize erosion and undermining of channels and structures.	During and post-construction	Engineer and SELC	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-40		Monitor shoal development semi-annually and remove during regular maintenance or as-needed.	Maintain tidal exchange.	Maintenance	SELC	All
PDF-41	PDF-32	The Coast Highway 101 alignment and bridge approach will conform to California Department of Transportation (Caltrans) standards for sight distance and vertical clearance.	Ensure public safety.	Prior to construction	Engineer	Alternative 2A
PDF-42	PDF-33	Temporary speed limit reduction for the traffic detour approaches and exits will conform to safe highway design speeds.	Ensure public safety.	Prior to construction	Contractor	All
PDF-43	PDF-34	Maintain two-way circulation on public roadways and access to neighboring commercial establishments during project construction.	Minimize traffic conflicts and access issues.	During construction	Contractor	All
PDF-44		Restore roadway capacity upon completion of the new Coast Highway 101 bridge.	Minimize traffic conflicts and access issues.	Post-construction	Contractor	Alternative 2A
:PDF-45	PDF-35	Create a temporary pedestrian walkway/bicycle path on the west side of open lanes of Coast Highway 101 to allow beach users to continue to access the beach to the north and south.	Minimize land use conflicts and access issues.	During construction	Contractor	Alternative 2A
PDF-46	PDF-36	All temporary facilities used for contractor activities will be returned to either original or enhanced conditions upon completion of the project to the greatest extent possible, if not needed for future maintenance activities.	Minimize land use conflicts and access issues.	Post-construction	Contractor	All
PDF-47	PDF-37	Restore North Rios, Solana Hills, and Santa Inez trails and access to them to pre-project conditions after completion of construction use.	Minimize recreational conflicts and access issues.	Post-construction	Contractor	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-48	PDF-38	Design cobble blocking features (CBFs) to maximize burial and minimize exposed surface; treat with faux finishes to provide a more “naturalized” appearance.	Minimize contrast of new inlet and CBFs with existing beach environment.	Final design	Engineer	Alternative 2A
PDF-49	PDF-39	Complete Letter of Map Revision (LOMR) to formally modify the Flood Insurance Rate Map (FIRM) and/or Flood Boundary and Floodway map (FBFM), as required by City of Encinitas and FEMA.	Document revised floodway/floodplain boundaries.	Post-construction	Engineer and Contractor	All
PDF-50	PDF-40	Channels and infrastructure improvements (Coast Highway 101/inlet or I-5 bridge)will be reviewed by the County, Caltrans, City of Solana Beach, and City of Encinitas as appropriate prior to approval of associated grading plans.	Ensure structural integrity of proposed structures.	Prior to and during construction	Engineer and Contractor	All
		Materials Disposal/Reuse				
PDF-51	PDF-41	Construct longitudinal training dikes at sand placement sites.	Reduce nearshore turbidity.	During construction	Contractor	Alternatives 2A and 1B
PDF-52	PDF-42	Release material at offshore stockpile and nearshore sites close to the ocean floor (e.g., directly from a subsurface pipe or via a vertical pipe extending from the barge downward toward the ocean floor).	Reduce drop height, settling time (and potential sand drift and loss), and surface turbidity at offshore (SO-5 and SO-6) and nearshore (off Cardiff) sites.	During construction	Contractor	Alternatives 2A and 1B
PDF-53	PDF-43	Monitor water quality per RWQCB 401 Certification; if outside parameters then implement operational controls or halt materials placement, as necessary.	Verify permit compliance.	During construction as per RWQCB 401 Certification	Qualified biologist	All
PDF-54	PDF-44	Place material around storm drain outlets to allow continuation of proper drainage.	Continue proper drainage.	During construction	Contractor, in coordination with City Engineer	Alternatives 2A and 1B

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-55	PDF-45	Conduct underwater survey of proposed anchoring, monobuoy, and routes of sinker discharge pipeline to verify absence of sensitive hard-bottom habitat; if found, relocate to avoid impacts.	Avoid direct impacts to sensitive hard-bottom habitats.	Prior to and during construction	Qualified biologist	Alternatives 2A and 1B
PDF-56	PDF-46	Design offshore and nearshore placement sites to avoid artificial reefs, kelp, and other hard-bottom features to the satisfaction of the Corps. Provide a minimum 500-foot buffer zone from kelp beds and potential kelp habitat.	Avoid direct impacts to kelp and sensitive hard bottom habitats.	Final engineering and during materials placement	Engineering contractor and construction contractor	Alternatives 2A and 1B
PDF-57	PDF-47	Assess habitat suitability for grunion spawning prior to construction, if construction is to occur during the spawning season. During the grunion spawning period of March through August, all proposed sand disposal sites will be monitored for grunion runs concurrently, unless the beach consists of 100% cobble (i.e., there is not sand on the beach). Grunion monitoring will be conducted by qualified biologists for 30 minutes prior to and 2 hours following the predicted start of each spawning event. If a grunion run consisting of more than 100 fish is reported, the biologist will coordinate with the resource agencies to determine appropriate avoidance and minimization measures (e.g. relocation/rescheduling of work/equipment or specification of acceptable vehicle routes).	Minimize impacts to grunion.	March through August and per CDFW annual pamphlet *Expected Grunion Runs* (CDFG 2010a)	Qualified biologist	Alternatives 2A and 1B
PDF-58	PDF-48	A Marine Mammal and Turtle Contingency Plan will be prepared prior to construction approved by National Marine Fisheries Service. A pre-construction contractor training will be conducted by a qualified biologist to educate workers with respect to protected marine species and avoidance measures	Reduce interactions between vessels and protected marine species.	Prior to initiation of construction and during construction	Qualified biological	All

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
		required by the contingency plan. Monitoring during construction will include marine mammal observers on project vessels who will notify the vessel operator if a protected marine species is in the vicinity.				
PDF-59	PDF-49	Coordinate barge operations with the U.S. Coast Guard (USCG).	Minimize restricted areas/durations to maximize fishing opportunities.	Prior to initiation of construction and during construction	Contractor	All
PDF-60	PDF-50	Clearly mark pipelines used during materials transport (including offshore stockpiling efforts), including both floating and submerged, as “navigational hazards.”	Warn recreational users of water-based activities to ensure safety and avoidance.	Before and during activities in the ocean	USCG (via construction contractor)	All
PDF-61	PDF-51	Issue Notice to Mariners and maintain 300-foot buffer around monobuoy.	Warn recreational users of water-based activities to ensure safety and avoidance.	Before and during activities in the ocean	USCG (via construction contractor)	All
PDF-62	PDF-52	Designate a 300-foot buffer around the lane designated for barges to use to reach disposal/reuse sites and track actual routes. Employ Global Positioning System (GPS) tracking on barges to track disposal activity.	Minimize gear loss and fishing conflicts.	During construction	Contractor	All
PDF-63	PDF-53	Restrict public access at sand placement sites, both on the beach and in the nearshore ocean adjacent to the pipeline and monobuoy	Public safety during construction.	During construction	Contractor, in coordination with local lifeguards	Alternatives 2A and 1B
PDF-64	PDF-54	Temporarily relocate mobile lifeguard towers, if necessary	Ensure public safety during construction.	During construction	Contractor, in coordination with local lifeguards	Alternatives 2A and 1B
PDF-65	PDF-55	Place sand to avoid blocking line-of-sight at permanent lifeguard towers. All sight lines from the viewing platforms of the lifeguard towers will be maintained and there will be no interference with views for the lifeguards.	Ensure public safety during construction.	During construction	Contractor, in coordination with local lifeguards	Alternatives 2A and 1B

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
PDF-66	PDF-56	Post signs advising the public of the presence of steep sand slopes (e.g., scarps) should they develop on beaches where sand is being placed.	Reduce risks to public health and safety.	During construction	SELC in coordination with Marine Safety departments in the cities of Encinitas, Solana Beach, and San Diego	Alternatives 2A and 1B
PDF-67	PDF-57	Prior to opening areas of beach with placed materials, spread the material and check it for potential hazards (e.g., foreign objects in the sand).	Reduce risks to public health and safety.	During construction	Contractor	Alternatives 2A and 1B
PDF-68	PDF-58	Coordinate the schedule at individual materials placement site to the extent possible to avoid major holidays and special events.	Minimize land use and recreation conflicts.	During construction	SELC	Alternatives 2A and 1B
PDF-69	PDF-59	Dedicated parking lots will be identified for employee parking during peak beach attendance to minimize effects to public parking availability, as necessary. A shuttle will likely be necessary for some of the more distant lots.	Maintain public beach access.	During construction	Contractor	Alternatives 2A and 1B
PDF-70	PDF-60	Maintain horizontal access along the back beach where adjacent vertical access is not available. Where horizontal access is limited, (e.g., where a wet beach directly abuts bluffs), vertical access will remain to allow public access on either side of the active sand placement area as long as public safety is not compromised.	Maintain public beach access.	During construction	Contractor	Alternatives 2A and 1B
PDF-71	PDF-61	Cover discharge pipeline with sand at consistent intervals to facilitate access from the back beach to the water.	Maintain public beach access.	During construction	Contractor	Alternatives 2A and 1B
PDF-72	PDF-62	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	Notify residents of nighttime noise.	During construction	Contractor	Alternatives 2A and 1B

Updated Project Design Feature ID	Previous Project Design Feature ID	Design Features	Purpose	Timing	Implementation Responsibility	Alternative(s) Project Design Feature Applies To
		feet of a specific residence where sleep disturbance may occur.				
PDF-73	PDF-63	Conduct surf condition monitoring in areas with placement of sand to verify the modeling results and document any changes in coastal conditions.	Ensure no adverse changes to coastal conditions.	Prior to, during, and following construction activities	SELC and Engineer	Alternatives 2A and 1B
PDF-74	PDF-64	Conduct sand placement at the Torrey Pines placement site outside of the bird breeding season (April 1 through September 15, or after August 1 with confirmation of cessation of nesting). Sand placement at Cardiff placement site may happen year round. However, at both placement sites, monitoring shall be conducted during sand placement to avoid impacts to foraging snowy plover. Should foraging plover be present, the monitor will direct sand placement away from the foraging plover to allow time for the bird(s) to leave the site. In addition, night lighting shall be shielded and directed away from the back beaches. Should nesting plover be detected, a buffer around the nest would be established in consultation with the wildlife agencies and sand placement directed away from the nest.	Minimize impacts to snowy plover at placement sites.	During materials placement.	Qualified biologist	Alternatives 2A and 1B

2.11 MONITORING, MAINTENANCE, AND ADAPTIVE MANAGEMENT

Implementation of the SELRP would require a comprehensive monitoring program with multiple components to ensure compliance with regulatory requirements and mitigation measures identified in this EIR/EIS, track project success, and identify adaptive management strategies for use in the future. While it would be premature to develop a detailed monitoring program prior to determination of the Agency Preferred Alternative and LEDPA, this section discusses the framework and approach anticipated for the monitoring program. The comprehensive monitoring program for the SELRP would have three primary components with different goals:

1. Construction monitoring: to minimize and avoid impacts associated with construction
2. Restoration monitoring: to track restoration success
3. Long-term monitoring and adaptive maintenance: to maintain lagoon functions and services into the future

Some overlap between the components is anticipated, and each program component is described in general below. It is anticipated that the three components could be documented in separate plans: one with a focus on construction requirements identified in this EIR/EIS; one to track meeting restoration goals and success criteria; and a longer-term program focused on maintaining the functions and services of the restored lagoon into the future. This third program would focus on monitoring and maintenance with an emphasis on adaptive management strategies as the lagoon evolves under changing future conditions. Some monitoring protocols may overlap between the programs but would be focused on the specific goals of each plan. As construction is completed, the focus would shift to meeting success criteria, then strategies would shift to longer-term restoration monitoring and maintenance objectives. The final details would be determined upon selection of an alternative and identification of permit conditions with the resource agencies. Items such as exact monitoring locations, frequencies, and methodologies would depend on the alternative to be implemented and would be detailed as part of the permitting process.

2.11.1 CONSTRUCTION MONITORING PROGRAM

The construction monitoring program for the SELRP would be compiled from the project design features and mitigation measures identified in this EIR/EIS and designed to minimize and avoid impacts to resources that could occur during construction of the project. The construction monitoring program consists primarily of the Mitigation Monitoring and Reporting Program (MMRP) prepared for this project, but will also include additional permit conditions placed by agencies as part of the final project permitting process. Specific measures to be included in the construction monitoring program are identified within this EIR/EIS in Table 2-26 and as mitigation measures at the end of each resource analysis in Chapter 3. Further discussion on the intent and components of this program follows.

The program would address potential impacts associated with both construction within the lagoon as well as materials disposal/placement. The SELRP is a restoration project and, as such, has been designed to be proactive in incorporating measures to reduce or avoid impacts to resources where possible. A number of *project design features* have been incorporated into the project to avoid or minimize impacts, as identified in Table 2-26. *Mitigation measures* have also been identified under specific resources to reduce potential significant impacts, as identified throughout Chapter 3. Additional measures could be identified as conditions associated with permits that would be issued by regulatory agencies prior to project initiation. Compliance with these *permit conditions* would also be integral to construction monitoring. The monitoring program for construction would be composed of these different measures.

In general, the anticipated construction monitoring program can be divided into three distinct phases:

1. pre-construction (initiated approximately 1 year prior to construction),
2. during construction (up to approximately 36 months), and
3. post-construction (proposed 5–10 years after construction is complete).

Detailed measures are identified throughout this document, either in Table 2-26 or under specific resource discussions.

Many of the proposed materials placement sites have been identified based on previously authorized projects to minimize potential effects to sensitive resources (2001 and 2012 RBSPs). Since those projects have not resulted in significant environmental impacts, long-term monitoring is not anticipated at those sites, although specific resource agency conditions will be identified as part of the permitting process. Sand volumes proposed for placement at other sites (e.g., Cardiff, which is a previously used site, but would have a larger footprint under the SELRP) have been limited to amounts that are not predicted to result in significant effects to resources by modeling conducted for the project. Long-term monitoring at those sites is not necessarily anticipated, but would be determined through discussions with the various regulatory and resource agencies. Because pre-construction monitoring is designed to minimize construction impacts rather than establish a baseline for post-construction monitoring to determine the success of the restoration itself, it is different from the lagoon restoration component, which is addressed under the lagoon restoration monitoring program discussion below.

2.11.2 LAGOON RESTORATION PLAN

A restoration plan would be implemented to measure the success of the lagoon restoration. A conceptual restoration plan has been prepared and is attached as Appendix Q to this EIR/EIS. The conceptual restoration plan is a component of the project and identifies requirements for pre-, during, and post-construction activities to facilitate restoration (e.g., planting and irrigation), as well as measure the success of the restoration (e.g., monitoring). The plan provides a framework of the monitoring program to enable an analysis of potential impacts associated with its implementation under CEQA and NEPA. Once the final alternative is selected, a final restoration plan will be prepared.

Regardless of the alternative, the restoration plan would include requirements for pre-construction local plant salvage and/or seed collection (particular focus would be given to existing rare and sensitive plants), planting plans, weed abatement, and remedial measures, as well as established annual success criteria.

Monitoring for the lagoon restoration component of the SELRP would be primarily focused on the lagoon itself and would include pre- and post-construction monitoring. The post-construction monitoring phase would identify a 5- to 10-year period that would focus on meeting restoration permit conditions and/or success criteria. Once those criteria are met, monitoring and management would shift over to the more long-term program focused on adaptive management discussed below.

Pre-and post-construction monitoring would be designed to focus on establishing a pre-construction baseline for lagoon conditions and sensitive species, then monitoring and confirming project success criteria are met over the longer term (5–10 years). Post-construction monitoring can also be tied to adaptive management actions that will facilitate project success. While the main components of the pre- and post-construction monitoring program have been identified, a detailed program will be identified after the CEQA Agency Preferred Alternative and LEDPA have been determined as part of the permitting process, and during final engineering of the project. This program will also incorporate permitting conditions identified after the Final EIR/EIS has been certified/approved, but prior to the initiation of construction.

Pre-construction monitoring for the SELRP would focus on establishing a baseline for assessing the success of restoration efforts. Each of the pre-construction surveys conducted for the lagoon restoration itself would have a post-construction component as well. The potential effects of restoration on sensitive bird species is one of the most important aspects of the SELRP. Monitoring bird species would include species-specific surveys and monitoring of the avian assemblage as a whole within the lagoon. Types of surveys anticipated as part of the monitoring program are identified in Table 2-27, but this program may be altered or augmented based on permit and agency consultation through the permitting process.

Table 2-27
Anticipated Biological Survey Framework for Informing Restoration Success

Type of Survey	Purpose
Benthic Macroinvertebrates	Evaluate the health and functioning of the restored lagoon, due to importance in estuarine food webs. Benthic invertebrates can affect, and be affected by, physical processes, such as erosion, sedimentation, and nutrient cycling. Monitoring would include sampling of both epifauna and infauna.
Fish	Reflect suitability of subtidal habitat as Essential Fish Habitat. As fish are expected to colonize the newly created channels almost immediately, post-construction monitoring for fish in shallow subtidal and intertidal channels would begin immediately following construction.
Light-footed Ridgway's Rail	Light-footed Ridgway's rail utilize many of the habitat types within the lagoon (low and brackish marsh for nesting, in addition to mid- and high-marsh and mudflat for foraging), and the project would affect each of these to different extents. Surveys for this species would inform continued habitat availability for light-footed Ridgway's rail within the restored lagoon.
Belding's Savannah Sparrow	Belding's savannah sparrow currently inhabits all three lagoon basins. Post-construction surveys would be designed to provide information on resiliency and recovery of this species.
Secretive Marsh Bird Surveys	Post-construction surveys are anticipated to demonstrate use of newly constructed low-marsh habitat and well as resiliency and recovery of secretive marsh bird populations.
General Avian Use of the Restored Lagoon	Monitoring of use of the lagoon by water-dependent birds, including shorebirds, waterfowl, gulls, terns and others, is anticipated to be conducted monthly for a period of 5 years to assist in determining if the project has met its goals and objectives for improving habitats for bird species.
Habitat/Species Coverage	The development of planted areas, i.e., saltmarsh and transition habitats, as well as sensitive species being tracked, would be monitored post-construction for 5 years in order to document the success of the restoration project's planting plan and inform adaptive management actions.

Post-construction monitoring of the SELRP would be focused on the lagoon restoration component and designed to document achievement of project goals and objectives, including habitat improvements for plants and wildlife, success of revegetation efforts, use of the site by sensitive species, maintenance of tidal exchange and circulation, water quality improvements, and other measures of lagoon functions and services. This analysis would also be used to inform potential future adaptive management decisions and actions. Post-construction monitoring would document as-built conditions and provide comparison with pre-construction baseline conditions immediately after construction. Intensive short-term monitoring of restoration success is anticipated to continue annually for a minimum period of 5 years after construction. It is more likely the short-term monitoring period would be developed based on 10 years of ecological performance standards; however, if success is achieved prior to 10 years, the site can transition to the less intensive, less expensive, long-term monitoring and management phase that would adapt to ecological conditions into the future.

General processes to be monitored are identified below and are intended to educate maintenance and adaptive management efforts in addition to documenting success of the project goals and objectives. Specific monitoring protocols would be developed as part of the permitting process in consultation with the resource and permitting agencies. A project monitoring plan would be developed as part of this consultation process to identify the monitoring methods, success criteria, and remediation required, if any, of the program to be implemented as part of the SELRP.

Monitoring the physical parameters of the lagoon following construction is designed to guide short- and long-term management activities such as inlet maintenance dredging or removal of sediment deposition. Monitoring would include developing protocols for the following lagoon surveys. Additional requirements may be identified as part of the permitting and final design process.

2.11.3 Maintenance and Adaptive Management

After success criteria established in the restoration plan have been met, monitoring at the lagoon would shift to a longer-term strategy to inform the adaptive management component of the SELRP. The maintenance and adaptive management component would include both the anticipated maintenance regime and an adaptive management plan. Long-term monitoring would be an integral part of an adaptive management program established to guide maintenance strategies into the future. Conceptual activities associated with adaptive management are identified in Appendix Q, and summarized below. Development of the detailed adaptive management program would occur after confirmation of the CEQA Agency Preferred Alternative and final Corps determination of the LEDPA, and during the final engineering phase of the project, prior to the initiation of construction.

The maintenance plan would identify those areas of the lagoon that are anticipated to require periodic maintenance, such as inlet or subtidal basin maintenance and/or dredging, or less frequent channel maintenance in other areas of the lagoon. The adaptive management plan would identify remedial measures that may be implemented if success criteria put in place as part of the project or permit conditions are not met or if conditions change during long-term monitoring and need to be addressed. Some of these actions may include, but are not limited to, experimental planting of certain areas, additional dredging, replanting of saltmarsh and transitional habitats, adaptive management strategies in response to fires or floods, and amendment of soils. Detailed plans would be developed as part of consultation with permitting and natural resource agencies during the permitting approval process; however, it is anticipated that the long-term management plan would be a living document and would be updated regularly, as necessary. General components associated with the adaptive management strategy are described below.

1. **Replacement Planting**. Planted material that fails to become established would be replaced with the same or similar plant species. An assessment to determine potential causes of plant mortality would be performed and additional measures to prevent continued plant mortality would be implemented. Replacement vegetation would be installed between October 1 and March 31, to the extent possible.
2. **Weed Abatement**. Weedy species would be removed from the restoration site frequently so they do not compete with the establishment of native plantings.
3. **Trash Removal.** Trash would be removed and disposed of in an acceptable manner, e.g., trash bins or landfill.
4. **Bank Protection Repair.** Should severe storms or other events result in damage to bridge and channel armor, repairs may be completed. Channels would be monitored for erosion and bank repairs made in the event of damage and/or erosion. Additional hardening or armoring beyond the initial project scope would not occur without consultation and permits from appropriate agencies.
5. **Biological Monitoring and Maintenance of Habitat Quality.** Regular biological monitoring would be conducted to ensure that the lagoon meets biological goals. These activities would include:
    - Fencing to provide habitat protection and posting of No Trespassing signs,
    - Enforcement of regulations associated with the restoration of the wetlands and protection of listed species,
    - control of nonnative invasive plant species by mechanical and chemical means as appropriate, and
    - control of feral/exotic animal species using trapping and barriers as appropriate.
6. **Nesting Areas/Breeding.** A comprehensive program of inspection and maintenance of sensitive species breeding and nesting areas would be included as part of the biological monitoring program. Nesting area management would require both regular control of excessive, especially weedy vegetation (such as those listed as High on the Cal-IPC species list), and of predators in the surrounding urban environment.
7. **Threatened and Endangered Species.** Species-specific monitoring and management objectives will be established in conjunction with the resource agencies for threatened

and endangered resident species. Measures may include ongoing surveys, habitat improvements, predator control, or other activities for the benefit of the species.

8. **Inlet Maintenance.** In addition to potential closure of the inlet by sediment transported during an extreme storm event, the regular flood and ebb currents moving through the inlet would build a flood shoal in the interior of the inlet. These sediment deposits in the flood shoal can change the habitat distribution within the wetlands by reducing the tidal range and/or by raising the elevations. As part of the adaptive management program, criteria establishing thresholds for initiating inlet maintenance would be developed.

9. **Channel Maintenance.** While maintenance of the inlet itself is anticipated to occur as frequently as every year, depending on the alternative, vegetation encroachment or sediment accumulation could occur in portions of lagoon channels over time (e.g., due to storm events). Channels would be monitored for sedimentation and vegetation encroachment that reduces hydraulic capacity, and removal of sediment and/or vegetation may occur. Maintenance of focused areas within lagoon channels is anticipated approximately every 10 years but would be tied to specific thresholds for initiating maintenance activities, which could involve vegetation removal and hauling from the site, or sediment removal through dredging small areas of the lagoon. Dredging beyond the initial channel dimensions would not occur without consultation and permits from appropriate agencies.

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CHAPTER 3.0
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

A total of 16 environmental issue areas are evaluated in this Draft EIR/EIS. Sections 3.1 through 3.16 describe the affected environment, or existing conditions, within the project study area for each issue area, and disclose the environmental consequences associated with implementation of the proposed project, plus alternatives. The organization of each of these sections is described in more detail below.

To determine the environmental consequences, or impacts, for each issue area, the proposed project and its alternatives are compared to a baseline condition. Under CEQA, the difference between the proposed project/alternatives and the baseline is then compared to a threshold to determine if the difference is significant. Under NEPA, this difference is used to discuss the magnitude of the potential effect due to the proposed project/alternatives. CEQA and NEPA may use different baseline conditions. The CEQA and NEPA baselines used to analyze the SELRP are also presented below, following the overview of the organization of each section.

3.0.1 ORGANIZATION OF EACH SECTION

To assist in comparing information about the various environmental issues, each section is linked to an issue area and is organized in the manner outlined in the following paragraphs.

Affected Environment describes the existing conditions for both the lagoon study area (Figure 1-2) and the materials disposal/reuse study area (Figure 1-3). The Affected Environment provides a description of conditions before project implementation and serves as the baseline physical conditions for the analysis of project impacts. More detail regarding the baseline is provided following this overview. This section is consistent with NEPA terminology but corresponds to Existing Conditions under CEQA.

CEQA Thresholds of Significance defines specific criteria used to determine whether an impact is or is not considered to be significant under CEQA. CEQA requires that an EIR include a determination of significant effects and identification of feasible mitigation measures to minimize those effects, while NEPA does not. According to NEPA regulations, a finding of whether a proposed action significantly affects the quality of the human environment is determined by considering the context in which it will occur and the intensity of the action (40 CFR Section 1508.27). Therefore, NEPA uses significance to determine the level of documentation required for projects. Once a decision to prepare an EIS has been made, the magnitude of impact is evaluated and no further judgment of its significance is required. The thresholds of significance identified in each issue area of this EIR/EIS and the impact determinations are, therefore, directly associated with the analysis under CEQA to determine the potential significant effects of the proposed project and its alternatives. To facilitate review, each CEQA significance criterion is identified with a letter, and conclusions under the analysis refer back to those criteria for each CEQA conclusion. CEQA regulations generally define a significant effect on the environment as a substantial or potentially substantial adverse change in the physical environment (CEQA Guidelines Sections 15064 and 15126.2). Determinations of significance made in this EIR/EIS apply only to CEQA, not to NEPA. The significance thresholds used in this EIR/EIS also encompass the factors taken into account under NEPA to evaluate the context and intensity of the SELRP, but provide a relative context for understanding the magnitude of potential impacts only.

Questions listed in Appendix G of the CEQA Guidelines and thresholds established by the County of San Diego were considered for use as significance thresholds to characterize impacts, although different thresholds are sometimes used in Chapter 3 to reflect the unique and dynamic nature of lagoon enhancement and materials placement activities. Thresholds not developed from Appendix G or the County have been derived from previous enhancement projects involving lagoon enhancement or beach sand replenishment, including the San Dieguito Wetland Restoration Project EIR/EIS (SCH #98061010), the Bolsa Chica Lowlands Restoration Project EIR/EIS (SCH #2000071068), and the 2012 Regional Beach Sand Project EA/EIR (SCH #2020051063).

Environmental Consequences provides independent analyses of the two project components: lagoon restoration and materials disposal/reuse. The four lagoon restoration alternatives and each of the materials disposal/reuse locations are analyzed at an equal level of detail. This approach allows for comparison of the alternatives under each resource area and will facilitate the ultimate selection of an agency-preferred alternative for the Final EIR/EIS. While the analyses for lagoon restoration and materials disposal/reuse are separate, this is not meant to imply there is no connection between activities. There may be occasions when activities would occur in similar locations and/or times, but the analyses have been separated simply to facilitate reading of the document. Consistent with federal and state regulations and guidelines (40 CFR Section 1508.27; CEQA Guidelines Section 15064, 15126.2[a]), direct and indirect impacts are evaluated. Cumulative impacts are evaluated in Chapter 5 of this EIR/EIS. This section is consistent with NEPA terminology but corresponds to Impact Analysis under CEQA.

For the lagoon restoration alternatives, Alternative 2A was identified as the proposed project under the Draft EIR/EIS since it would result in the largest degree of overall impact. As discussed in Section 2.3, the Draft 404(b)(1) Alternatives Analysis, included as Appendix O to this Final EIR/EIS, identifies Alternative 1B – Refined as the preliminary LEDPA. The identification of Alternative 2A as the proposed project in the Draft EIR/EIS did not reflect a preference for implementation of that alternative. The lagoon restoration evaluations provide a discussion of Alternative 2A first, followed by Alternative 1B, Alternative 1A, and the No Project/No Federal Action Alternative, which represent incrementally lesser overall impacts. The analysis incorporates the implementation of design components, regulations, and proactive design features into the conclusions. Each alternative analysis addresses short-term impacts associated with construction of the lagoon restoration project. Permanent impact analyses address impacts associated with construction, as well as long-term intermittent impacts associated with anticipated periodic maintenance and adaptive management of the lagoon.

For the SELRP, the restoration activities are water dependent and must be conducted within Corps jurisdiction to be effectively implemented. The No Federal Action Alternative, therefore, assumes that no activities would take place within Corps jurisdiction, which encompasses Escondido Creek and adjacent wetlands and riparian areas, the lagoon, and the Pacific Ocean. The only aspects of the project not within Corps jurisdiction are the construction staging and access roads, as well as some portions of Coast Highway 101 and the beach placement sites. Therefore, no restoration activities could occur without a federal action (a DA permit from the Corps) and the No Project Alternative is the same as the No Federal Action Alternative.

The materials disposal/reuse analysis is also organized by lagoon restoration alternative, then by generalized type of placement, as appropriate. Under Alternative 2A–proposed project and Alternative 1B, locations proposed for materials placement include offshore stockpile areas (SO-6 and SO-5), the nearshore zone (Cardiff), beaches (Leucadia, Moonlight, Cardiff, Solana Beach, and Torrey Pines), and on-site use for transition and nesting areas. Construction of Alternative 1A is associated with off-site disposal in LA-5 only, as well as limited on-site use for transition areas and nesting areas. Analysis of the overdredge pit is generally addressed under the lagoon restoration component since it would be located within the dredged area and is encompassed in the basin disturbance footprint. For many issue areas, the effects associated with sand placement would be related to the type of placement rather than specific placement sites. Where the specific locations could result in different effects, the impact analysis is clearly defined by site.

For both the lagoon restoration alternatives and materials disposal/reuse scenarios, the analyses present evidence for the cause-and-effect relationship between the project alternatives and the expected changes in the environment. The magnitude, duration, extent, frequency, range, or other parameters of an impact are identified, to the extent possible, to discuss the magnitude of the potential effect and determine whether impacts would be significant under CEQA, or substantially adverse under NEPA. All potential effects, including direct effects and reasonably foreseeable indirect effects, are considered. Following the analysis, the level of significance is identified, as defined by CEQA. An impact may be deemed one of the following: no impact, less than significant impact, significant but mitigable impact, or a significant and unavoidable impact. Effects considered substantially adverse under NEPA are also identified. The two conclusions may differ based on different approaches to impact determinations, since NEPA is not specifically threshold-driven for most resources. The definitions of these terms are provided following the more detailed discussion of baselines under CEQA and NEPA in Section 3.0.3.

It should be noted that the structure of Section 3.16 Global Climate Change and Greenhouse Gas Emissions, varies slightly from the format described above. To thoroughly analyze the project's resiliency to sea level rise and extreme events, the proposed project and alternatives have been analyzed for the horizon years of 2065 and 2100, in accordance with guidance set forth by the State Coastal Conservancy (State Coastal Conservancy 2012). This section addresses greenhouse gas emissions as well as effects possibly related to predicted sea level rise.

Mitigation measures identify the means by which impacts could be reduced or avoided in cases where the analysis determines such impacts to be significant or substantially adverse under CEQA or NEPA, respectively. Standard existing regulations, requirements, programs, and procedure, as well as project design features in Table 2-26, are considered in the impacts analysis. It should also be noted that the SELRP is a restoration project, and therefore has proactively incorporated a number of features into design that avoid potentially significant impacts or enhance the ability of the project to successfully restore functions and services of the lagoon system. Specific mitigation measures are tied to a particular significant or substantially adverse impact identified within the analysis and describe additional, potentially feasible actions to minimize adverse impacts or reduce significant impacts to less than significant levels. Upon approval of the EIR/EIS, a mitigation monitoring program would be adopted to ensure implementation of identified mitigation measures. Project design features identified proactively would also be incorporated into final project requirements.

Significance after mitigation identifies the impacts that would remain after application of mitigation measures, and whether the remaining impacts would or would not be considered significant under CEQA. When these impacts, even with the inclusion of mitigation measures, cannot be mitigated to a level considered less than significant, they are identified as "significant unavoidable impacts." Under CEQA, the lead agency must adopt a Statement of Overriding Considerations to approve a project with significant unavoidable impacts. In adopting such a statement, the lead agency finds that it has reviewed the EIR, has balanced the benefits of the project against the significant and unavoidable adverse environmental effects, and has determined that the benefits outweigh the adverse environmental effects. Thus, the significant and unavoidable environmental effects may be considered "acceptable."

3.0.2 CEQA AND NEPA BASELINES

As a joint EIR/EIS, this impact analysis considers both the CEQA and NEPA baselines. CEQA requires a project to review its impacts relative to "change from existing conditions," while NEPA directs that agencies use the process "to identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the environment" (40 CFR 1500-2[e]). The baseline for the SELRP is the existing environmental conditions against which impacts of the proposed action and its alternatives can be compared for both CEQA and NEPA. The analysis generally does not provide a separate conclusion distinguishing between the NEPA and CEQA baselines, as defined below.

In accordance with Section 15125 of the CEQA Guidelines, the baseline condition under CEQA is typically defined by the physical environmental conditions in the vicinity of a project as they exist at the time of the NOP, which, for the SELRP, was November 2011. Identifying the baseline condition for most projects is relatively straightforward, since many resources remain relatively static or change slowly over time. This is not the case for the SELRP, given that the conditions at the lagoon are dynamic and the coastal littoral process is seasonally and annually variable, influenced by environmental circumstances such as tidal fluctuations and storm events. Because of the dynamic conditions at the lagoon and along the coast, defining the baseline for the proposed project must consider this fluctuation in "existing conditions." For the SELRP, the analysis tries to capture rapidly transitioning habitat, for example, in the existing condition. In addition, extensive modeling was required to establish an average condition that realistically reflects existing conditions. The SELC and other agencies have historically gathered a large amount of data on selected topics, i.e., water quality and biology, which provides a large body of information. This provides a broader understanding of baseline than a single point in time. Therefore, some of the analyses within this EIR/EIS are reliant on baseline data that differs from, and is not limited to, the November 2011 issuance of the NOP and NOI. For example, the baseline for biological conditions with respect to species present is defined by historic information from experts. All information at the time of issuance of the NOP was consolidated to provide a cohesive picture of populations in the lagoon. A focused update to include light-footed Ridgway's rail survey information from 2012 and 2013 was included to capture changes in population that occurred during that time, and reflected conditions prior to public review of the EIR/EIS. Thus, the baseline for biological resources is concurrent with the issuance of the NOP, with the exception of light-footed Ridgway's rail, for which the baseline is the spring of 2013. Information on the origin and applicability of baseline conditions is included at the beginning of each issue area discussion.

3.0.3 DEFINITION OF KEY IMPACT TERMINOLOGY

Potential direct and indirect, as well as both permanent and temporary, impacts would occur with implementation of the SELRP. These impacts are defined below.

> Direct: Direct impacts are caused by the action and occur at the same time and place as the action.
>
> Indirect: Indirect impacts occur later in time or are farther removed in distance but are still reasonably foreseeable and attributable to project-related activities.
>
> Permanent (long-term): All impacts that result in irreversible effects or removal of resources are considered permanent.
>
> Temporary (short-term): Any impacts considered to have reversible effects on resources may be viewed as temporary.

Each impact is also further classified under both CEQA and NEPA. Under NEPA, determination of impacts that would result in substantial adverse effects on the environment is made. One of the following phrases is used to describe each impact as part of the analysis pursuant to CEQA:

> No impact: A designation of no impact is given when no adverse changes in the environment are expected.
>
> Less than significant impact: A less than significant impact is identified when the proposed project or alternatives would cause no substantial adverse change in the environment (i.e., the impact would not reach the threshold of significance).
>
> Significant impact: A significant (but mitigable or avoidable) impact is identified when the proposed project or alternative would create a substantial or potentially substantial adverse change in the physical conditions within the affected resource area. Such an impact would exceed the applicable significance threshold established by CEQA, but would be reduced to a less than significant level by application of one or more mitigation measures.
>
> Significant unavoidable impact: A significant unavoidable impact is identified when an impact that would cause a substantial adverse effect on the environment could not be reduced to a less than significant level through feasible mitigation measure(s).

3.1 LAND USE/RECREATION

This section describes existing environmental conditions related to land use and recreation in the area surrounding San Elijo Lagoon and the areas identified for materials disposal/reuse. This section also identifies pertinent policies and regulations governing land use and recreation activities in the designated project areas and evaluates the impacts associated with implementation of the proposed project and its alternatives.

3.1.1 AFFECTED ENVIRONMENT

San Elijo Lagoon

Lagoon Study Area Boundaries and Land Ownership

The lagoon is within the San Elijo Lagoon Reserve in north San Diego County, between the cities of Encinitas and Solana Beach, extending inland to the unincorporated County of San Diego community of Rancho Santa Fe. The Reserve is owned and managed by the SELC, CDFW (generally west of I-5), and County DPR (generally east of I-5). The lagoon study area boundaries generally include publicly owned parcels where restoration activities would occur. The lagoon study area boundary is not necessarily contiguous with the boundaries of the Reserve as the lagoon study area extends west to reflect the project actions at the beach (i.e., new inlet and beach nourishment with dredged material) and does not extend as far east as the Reserve since the focus of the restoration effort is wetlands, rather than uplands. Refer to Figure 1-2 illustrating the lagoon study area boundaries and land ownership.

While the vast majority of the lagoon study area is publicly owned, three privately owned parcels totaling approximately 3 acres are included within the lagoon study area boundaries. These parcels contain both channels and habitat within the lagoon. The water flow in these channels and connectivity to adjacent lagoon lands between Coast Highway 101 and the NCTD railroad are considered integral to restoration success. Thus, these three private parcels are considered part of the study area for restoration planning purposes.

The western extent of the study area includes the beach area west of the lagoon (excluding the parking lot at Cardiff State Beach) and extends into the water at the potential inlet location sites. The beach area west of the lagoon is within the jurisdictional boundaries of Encinitas, but a large stretch of the beach area encompassing Cardiff State Beach is owned by the State of California (see Figure 1-2). The southern extent of the study area includes the public ROW owned by Caltrans adjacent to I-5, but it does not include the private lands located on nearby slopes and uplands west of I-5. The northern boundary essentially coincides with the Reserve boundary and Manchester Avenue, with the addition of acquired mitigation lands in the northeast corner of the study area.

Existing Land Uses

The lagoon, partially located in the Encinitas community of Cardiff-by-the-Sea, is designated as Ecological Resource/Open Space/Park by the City of Encinitas General Plan (City of Encinitas 1989, amended 2003). The beach areas west of Coast Highway 101 are also designated Ecological Resource/Open Space/Park by the City of Encinitas. The lagoon is also officially designated as an Ecological Reserve by CDFW. To the north, surrounding land uses include primarily residential development with higher densities concentrated west of I-5 and a small strip of commercial land use, including “Restaurant Row” located along Coast Highway 101 adjacent to the north end of the lagoon, just south of the existing lagoon inlet. San Elijo State Beach and Cardiff State Beach occupy the coastal areas directly north and south of the existing lagoon inlet. Moving east of I-5, the northern boundary of the lagoon is bordered primarily by single-family residential development. The San Elijo Joint Powers Authority (water reclamation facility) is located north of the lagoon near the intersection of Manchester Avenue and Mackinnon Ranch Road. An area of agricultural uses is also located in this area adjacent to the lagoon along Manchester Avenue between I-5 and El Camino Real. The NCTD railroad ROW traverses the lagoon from north to south.

The lagoon is bordered to the south by the City of Solana Beach. Land uses bordering the lagoon in Solana Beach primarily consist of single-family residential development. An unincorporated area of San Diego County lies east of San Elijo Lagoon. The area is part of the San Dieguito Community Planning Area of the San Diego County General Plan. Currently, the area primarily consists of spaced rural development, agricultural uses, and undeveloped land (County of San Diego 2010). Residential development includes primarily large estate homes.

Existing Recreational Uses

The Reserve is a multiuse recreational area providing opportunities for walking, hiking, running, bird watching, equestrian use (permitted on trails east of I-5 only), nature observation, and photography. Within the Reserve, activities including swimming, wading, diving, fishing, watercraft, and other water-based recreation are not permitted within lagoon waters. Trails are accessible from trailheads located in the central and east basins, providing visitors with 7 miles of designated trails for recreation and exploration. These trails, shown in Figure 3.1-1, include the Nature Center Loop, North Rios Avenue Trail, Holmwood Canyon Trail, Solana Hills Trail, Dike Trail, Santa Inez Trail, Santa Carina Trail, Santa Helena Trail, and La Orilla Trail. The Nature Center Trail is a 0.5-mile Americans with Disability Act (ADA)-accessible loop trail with information panels at the Nature Center. To a great extent, the other identified trails follow old road beds or currently maintained utility roads, which have been in existence for many years. Most of the project area is not fenced but vegetation, topography, and private property limit access

Source: SANDAG 2012; AECOM 2014

0.5 0.25 0 0.5 Mile

LEGEND

StudyArea	**Existing Trail**	**Proposed Trail**
	Hiking Trail	Bike Trail
	Hiking/Equestrian Trail	Hiking Trail

Figure 3.1-1
San Elijo Lagoon
Trail Network by Alternative

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except at designated trailheads. Legal public access to the lagoon is limited to daylight hours. Portions of Manchester Avenue just north of the lagoon are striped for bicycle lanes.

As one of San Diego's largest coastal wetlands, San Elijo Lagoon and the Reserve serve as an outdoor classroom for students of all ages throughout San Diego County. A number of education and service learning programs are available to the public. The SELC, in cooperation with County DPR park rangers, offers volunteer-driven restoration opportunities such as trail maintenance and invasive species removal. The Nature Center is operated by one supervising park ranger, two park rangers, one park attendant, and volunteers with County DPR. The Nature Center hosted some 18,884 visitors in 2011 and the SELC Education Program provided outdoor programs to students and teachers from various parts of San Diego County over that same period (SELC 2012).

San Elijo Lagoon is also designated as a State Marine Conservation Area (SMCA) under the Marine Life Protection Act (MLPA) as shown in Figure 3.1-2 and discussed further in Appendix C. In accordance with California Code of Regulations (CCR) Title 14, Section 632(b)(139), boating, swimming, wading, and diving are prohibited within the San Elijo SMCA.

In the coastal area immediately west of the lagoon, Cardiff State Beach and San Elijo State Beach offer a variety of onshore and offshore activities. Land and recreational uses in this coastal area are discussed in more detail in the *Materials Disposal/Reuse Study Area* section below.

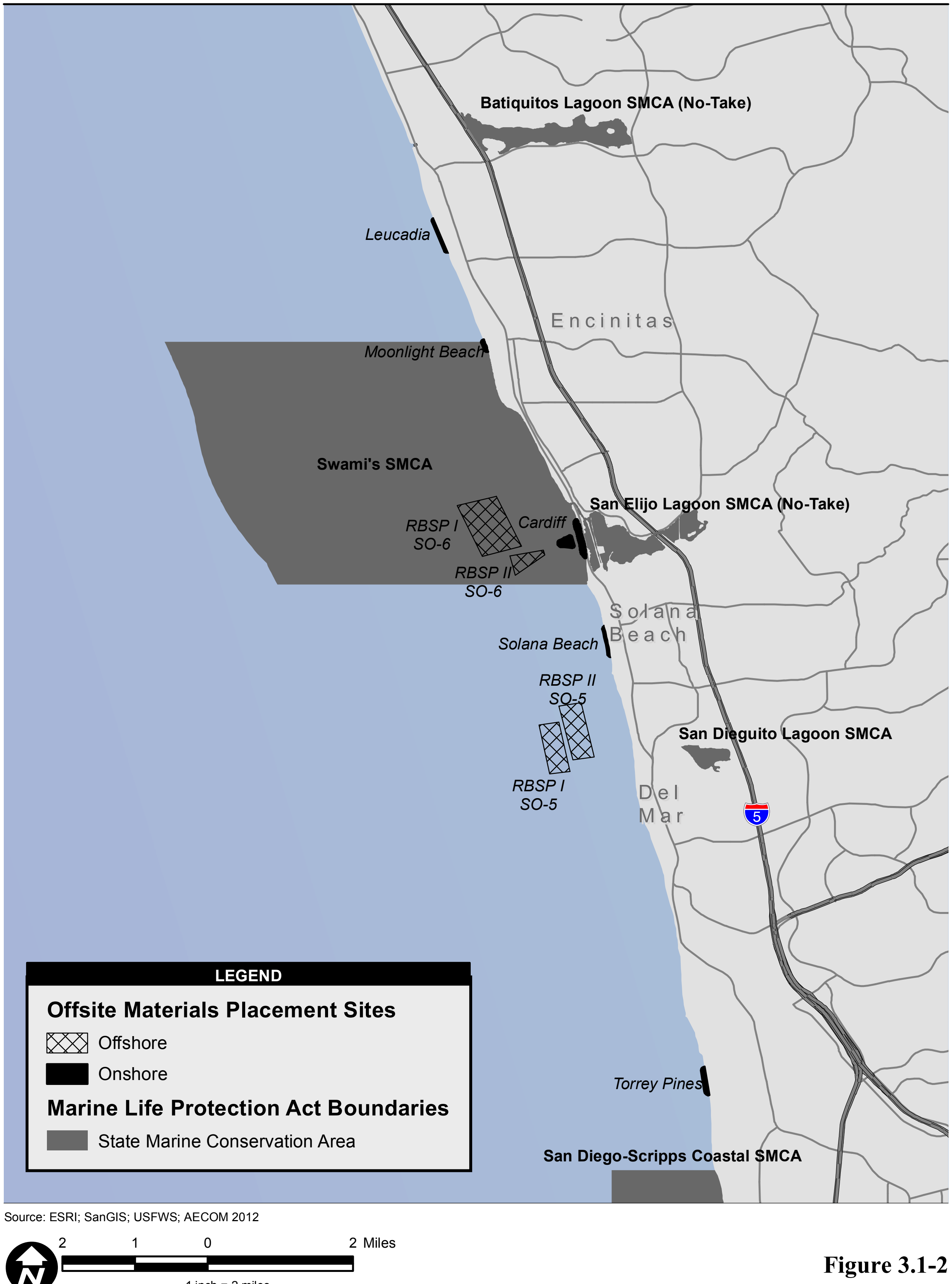
Materials Disposal/Reuse Study Area

Materials placement associated with the lagoon restoration activities could occur offshore, nearshore, or onshore. The Pacific Ocean and its shores are the focus of recreational activity and also define land uses in the project areas. As such, much of this discussion focuses on recreational uses; however, adjacent land uses and the applicable jurisdiction governing each site are identified. Offshore placement sites are described first, followed by onshore and nearshore sites in order from north to south (i.e., Encinitas, Solana Beach, and San Diego).

Information included in the discussion below is referenced from SANDAG's EIR/EA for the 2012 RBSP (SANDAG 2011). Information has been updated as needed with information included in the *San Elijo Lagoon Restoration Project Surfing Study* (Appendix N, M&N 2014).

Offshore Materials Placement Sites

There are two potential offshore placement sites for the SELRP, SO-5 and SO-6. The sites are located along the coast in relative proximity to the onshore materials placement sites but far enough offshore to be outside the littoral cell depth of closure. The offshore materials placement



Source: ESRI; SanGIS; USFWS; AECOM 2012

Figure 3.1-2
Marine Preserve Areas

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\Disposal_Sites_w_MPAs_JS.mxd, 2/14/2014, sorensenj sites are surrounded by ocean water, and recreational activities include diving, sailing, and fishing. Adjacent uses of submerged lands include sewer outfalls, artificial reefs, and underwater parks. Adjacent water uses to the offshore placement sites include kelp harvesting and whale watching. Kelp is gathered by a specially designed ship that cuts the kelp to a depth of approximately 4 feet below the surface. Kelp harvesting in the area is further described in Section 3.13 Socioeconomics/Environmental Justice. Gray whales migrate through San Diego's offshore waters twice a year on their way between summer feeding grounds off Alaska and calving areas in the coastal lagoons of Baja California, Mexico. Private and charter boats venture out to watch the migrating whales. The San Diego-La Jolla Underwater Park is located approximately 4 miles south of SO-6 and 2 miles south of SO-5.

Both SO-6 and SO-5 are located in ungranted sovereign lands under the jurisdiction of the SLC. A lease is required from the SLC for any portion of a project extending into state-owned lands that are under its exclusive jurisdiction. Each placement site is described below.

> *SO-6:* The refined SO-6 materials placement site is shown in Figure 1-3 and is located in the Swami's SMCA (further discussed in Sections 3.1.3, 3.1.4, and Table 3.1-3) west of San Elijo Lagoon and the San Elijo wastewater outfall pipeline. SO-6 is located seaward of a lease to the California DPR from the SLC (PRC 7365) for an underwater recreational park. This lease area extends along the shore from Swami's Point in Encinitas south to Tabletops reef in Solana Beach and it extends seaward approximately 3,500 feet. SO-6's closest boundary is approximately 250 feet away (seaward) from the lease area. The closest artificial reef within the underwater park is located approximately 2,250 feet from SO-6. There are no known shipwrecks within the area of SO-6.
>
> *SO-5:* The 2012 RBSP SO-5 materials placement site is located offshore of the San Dieguito River, as shown in Figure 1-3. SO-5 is approximately 2 miles north of the San Diego–La Jolla Underwater Park, a recreational area for divers. There are no artificial reefs or known shipwrecks within the area of SO-5.

One more offshore site has been identified for materials disposal activities; LA-5. LA-5 is regulated by EPA and the Corps and is described below:

> *LA-5*: LA-5 is an 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 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).

Because LA-5 is located 10 nautical miles offshore, the discussion of land use and recreation at this location does not apply as the site is surrounded entirely by open ocean. Recreational ocean fishing may occur in locations near LA-5. Ocean uses, such as commercial fishing, are discussed in Section 3.13 Socioeconomics.

Nearshore and Onshore Materials Placement Sites

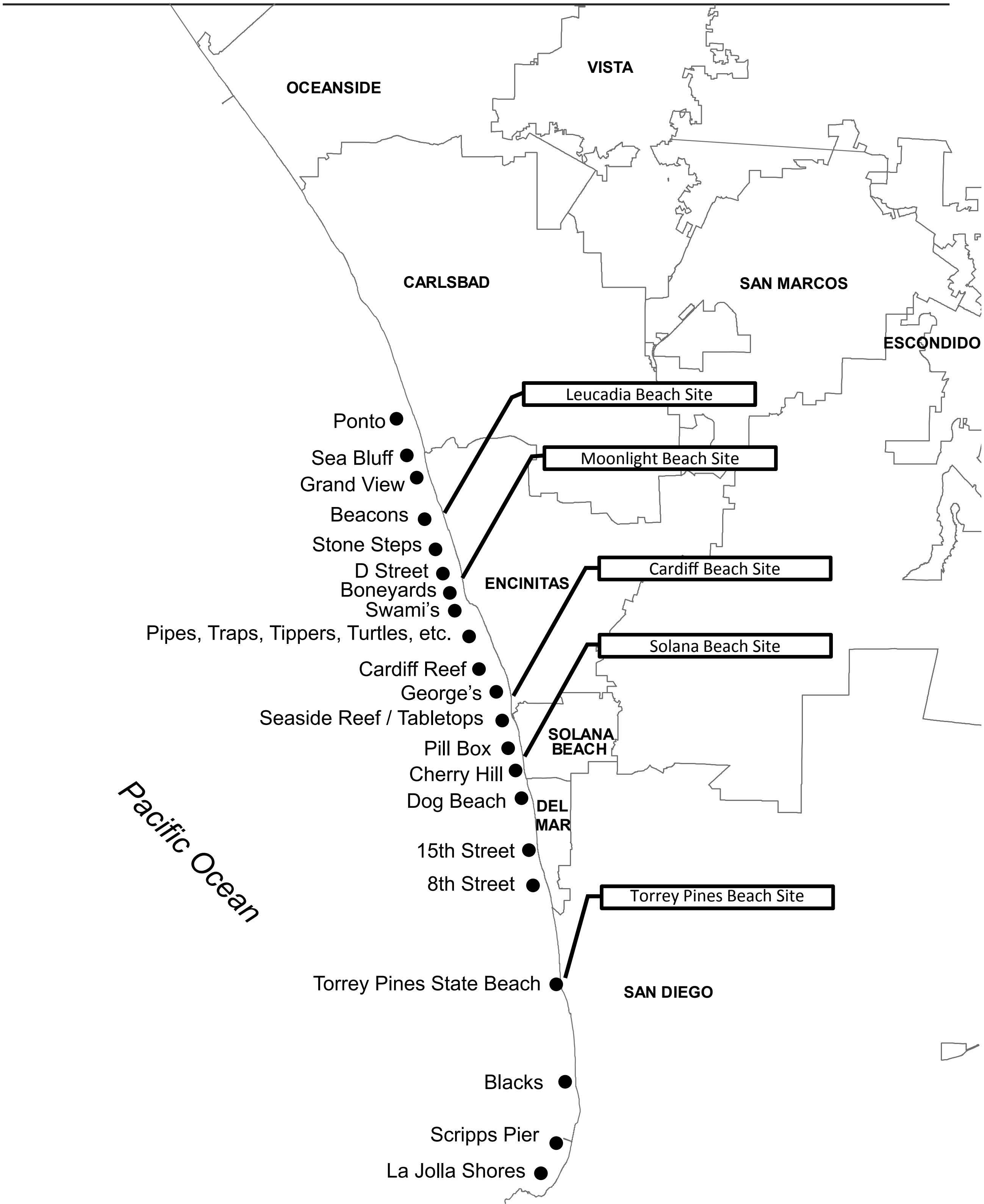
Generally, recreational activities at the nearshore and onshore placement sites include a variety of activities such as walking/jogging, swimming, surfing, stand up paddle boarding, windsurfing, sunbathing, beach combing, fishing, SCUBA and skin diving, hiking, picnicking, boating, sailing, and bicycling. Surfing occurs throughout the project area and within the vicinity of proposed nearshore and onshore materials placement sites. Because surfing conditions are dependent on localized sand movement and sandbar development, surfing is more specific to individual placement sites and is therefore discussed in more detail under each site. Surfing sites in the project areas are shown in Figure 3.1-3.

Each placement site is described from north to south by jurisdiction (i.e., Encinitas, Solana Beach, and San Diego). At proposed on-beach placement sites, most of the same onshore recreational activities occur and are therefore not discussed separately. Unique recreational activities and conditions, such as surfing, are noted under the discussion of that particular beach.

<u>Encinitas</u>

Within the City of Encinitas, there are three proposed materials placement sites: Leucadia, Moonlight Beach, and Cardiff. The SLC has jurisdiction over sovereign land at these sites. Authorization from the SLC would be required for implementation of the proposed materials disposal/reuse action. The proposed Moonlight Beach and Cardiff Beach materials placement sites and the SO-6 site are located within the Swami's SMCA boundary. The Marine Protection Act (MPA) regulations for Swami's SMCA allow sand replenishment and sediment management activities within its boundaries.

> *Leucadia:* The beach at this placement site extends approximately 2,700 feet (0.5 mile) from just south of the Grandview access stairs to Jasper Street. Adjacent land uses are predominantly residential, with some commercial uses along Coast Highway 101. This state beach is a unit of the state park system that is operated by the City of Encinitas. Recreation at the Leucadia site is limited due to difficult access. Public stairways exist at Grandview Street and Leucadia Boulevard (Beacon's), and several private stairways serve existing residences atop the bluff.



Source: Moffet & Nichol

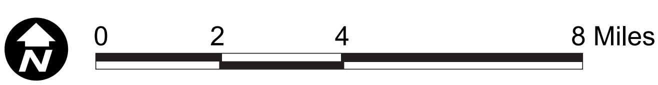


Figure 3.1-3
Surfing Spots near the Project Area

Popular surf spots near the placement site include Grandview and Beacon's (Figure 3.1-3). Beacon's is a reef break and is surfed year-round. The beach breaks offer lefts and rights as well as a right-hand reef break. Beacon's is surfable at all stages of the tide. It is often crowded and rocks are a hazard. Grandview is to the north of Beacon's and is also a reef with sand that provides surfing during most conditions.

Moonlight Beach: The proposed Moonlight Beach placement site is located at the foot of B and C streets at Moonlight State Beach. The proposed site is approximately 770 feet long (0.1 mile). Moonlight State Beach is a unit of the state park system but is operated by the City of Encinitas. Facilities at Moonlight State Beach include two lifeguard towers, volleyball and tennis courts, picnic facilities, recreational equipment rentals, and a snack bar. During the summer, Moonlight Beach is the central point for activities such as Junior Lifeguard programs, surf schools, and YMCA camps. The southern part of the site abuts the Encinitas City Marine Life Refuge (California Fish and Game Code Section 10913). Within the refuge boundaries, it is illegal to take invertebrates or marine life specimens except under a permit. Kelp harvesting, for recreational or commercial use, is prohibited except under a permit.

Residential uses occur adjacent to the site, to the north and south. The beach area is relatively flat but quickly slopes up to the east, north, and south. Public access is found at Moonlight State Beach (B and C streets) and south at the D Street stairway. Popular surf breaks along this reach include Stone Steps, Moonlight Beach, D Street, Boneyards, and Swami's (Figure 3.1-3). Swami's is the most popular spot in the vicinity. Boneyards and Swami's are reef breaks located south of the receiving beach and are bound to the north by scattered beach breaks in the vicinity of D Street and Moonlight Beach. These beach breaks are most popular in the summer and are of variable quality contingent on sandbar, swell, and wind conditions.

Cardiff: Sand placement is proposed both in the nearshore and onshore at Cardiff. The Cardiff site onshore is characterized by cobble beaches south of Restaurant Row. The site abuts Coast Highway 101 and is backed primarily by the lagoon. In its entirety, Cardiff State Beach stretches from Cardiff reef south to Seaside reef, encompasses approximately 25 acres, and has 6,550 feet of ocean frontage. The facility includes two parking lots (at each of the north and south ends of the beach), restrooms, and an emergency vehicle access ramp. The waters off of Cardiff State Beach also support nonrecreational uses, including commercial fishing and kelp harvesting. Commercial fishing generally occurs in the same locations as recreational fishing (refer to Section 3.13 Socioeconomics for further discussion of commercial fishing).

Popular surf breaks in the vicinity of the proposed placement beach are Cardiff reef to the north, George's (located just south of Restaurant Row) within the placement site, and

Seaside reef/Tabletops to the south (Figure 3.1-3). Surf breaks in the region are predominately reef breaks, with the exception of George's, which is a beach break of variable quality. Other notable surf spots in the region exist north of Cardiff reef within San Elijo State Park and include Pipes, Traps, Tippers, Turtles, and others. Surfing is very popular in this reach due to the abundance of spots and wind protection provided by offshore kelp.

North of the Cardiff placement site is San Elijo State Beach, which is a highly used recreational facility. This beach includes approximately 42 acres with 7,190 feet of ocean frontage and is more developed than Cardiff State Beach. Facilities include a 171-unit campground with five comfort stations, an 86-space day use parking lot, a unit office, an entrance station, a concessions building, a lifeguard tower, an informal campground center, and six beach access stairways. In addition to activities commonly encountered at Cardiff State Beach, San Elijo State Beach is also a popular camping spot. The bathymetry along San Elijo State Beach is typified by contours that are straight and aligned parallel to shore, with little variation. As such, waves typically "close out" along this reach of beach and are difficult to ride. This condition can vary, depending on conditions of waves, tides, and wind, but is basically unvarying. Therefore, this is not a primary surfing location under most conditions and can go for long periods of time without producing quality surf to ride.

Solana Beach

The proposed placement site in the City of Solana Beach is located just north of Estrella Street and extends approximately 4,700 feet (0.9 mile) south. Steep cliffs abut the placement site and the area consists of a gently sloping sand beach with scattered rocks and cobbles. Fletcher Cove Beach Park, also known as Pillbox, is the main park within Solana Beach. Residential development and some commercial uses exist along the bluffs above the placement site. The bluffs and beach are severely eroded, and numerous efforts to slow erosion, such as riprap, the filling in of sea caves, engineered in-fills, sea walls, and other revetments occur along the bluffs and beach. A lifeguard station, restrooms, and a public shower are available at Fletcher Cove.

Surfing in the area consists of scattered reef and beach breaks. The reef breaks are the most consistent and hence the most popular for surfing. A small subtidal reef exists immediately north of Pillbox. Surfing can be popular at this reef depending on offshore sand, swell, and tides. Surfing is also popular to the north at Seaside reef/Tabletops and to the south at Cherry Hill. Popular surf spots near the placement site are shown in Figure 3.1-3.

San Diego (Torrey Pines)

The proposed Torrey Pines placement site is located within the jurisdiction of the City of San Diego and California State Parks. The site stretches for approximately 1,620 feet (0.3 mile) and is located on Torrey Pines State Beach adjacent to North Torrey Pines Road. Nearby land use includes the open space of Torrey Pines State Beach/Reserve and Los Peñasquitos Lagoon. Public access is via trails at Torrey Pines State Beach/Reserve and along North Torrey Pines Road. The beach includes lifeguard stations and a 6- to 8-foot sand berm. Riprap has been placed along the west end of North Torrey Pines Road to protect it from eroding further.

As shown in Figure 3.1-3, popular surf breaks in the vicinity are scattered beach breaks of variable quality along Torrey Pines State Beach, reef and beach breaks to the north in Del Mar (i.e., 8th Street and 15th Street), and beach breaks to the south (i.e., Black's, Scripps Pier, and La Jolla Shores). Black's Beach, Scripps Pier, and 15th Street are likely the most popular spots in the area as they provide consistent surf year-round. In addition to the popular recreational activities found on other San Diego beaches, paragliding and parasailing are popular at this site.

The Torrey Pines placement site involves sovereign land granted to the City of San Diego by the SLC pursuant to Chapter 688, Statutes of 1933. As such, permits necessary for the SELRP would be granted by the City, as trustee of these lands.

3.1.2 CEQA Thresholds of Significance

A significant impact related to land use and recreation would occur if implementation of the proposed project would:

A. Result in long-term or permanent conversion of land to other uses that would strain similar, nearby uses in their ability to provide the same level of use as that of existing conditions;

B. Be incompatible with adjacent land uses as defined by planning documentation;

C. Conflict with existing or future planned areawide or local policy issues or plans;

D. Preclude viability of recreational activities, including surfing, during construction (temporary impacts) that result in a major loss of recreational uses; or

E. Result in permanent and major loss of recreational use areas or major conflicts with adjacent recreational uses, including surfing, in the post-construction period.

The CEQA thresholds of significance for land use and recreation were derived from the thresholds used in the EIR/EIS for the Bolsa Chica Lowlands Restoration Project (SCH #2000071068). These recreational thresholds are specific to the recreational uses that occur within the unique coastal environment in and around the lagoon and materials placement sites.

3.1.3 ENVIRONMENTAL CONSEQUENCES

This section discusses the environmental consequences, or impacts, associated with the SELRP related to land use and recreation. Potential adverse, significant, or beneficial direct and indirect impacts are identified as appropriate.

The relevant policies and regulations dictating land use and recreational uses at the project site and materials disposal sites are discussed within this section. A comprehensive description of applicable regulatory laws, plan, policies, and regulations is provided in Appendix C. Additional regulatory requirements pertaining to other specific topic areas, such as noise, air quality, water quality, etc., are discussed in their respective analysis sections.

Certain regulatory actions related to land use and recreation would be required prior to project initiation by various regulatory agencies. County DPR would decide whether to certify the EIR/EIS and approve the appropriate right-of-entry permits, then would issue an NOD and grant right-of-entry permits for work to be performed on County DPR-owned land. After certification of this EIR/EIS by the County DPR, the SELC would need to obtain a CDP from the CCC for both the lagoon restoration and materials disposal component of the project, as applicable. The CCC would also decide whether to issue a Consistency Certification in accordance with the California Coastal Act (CCA) or a Waiver of Federal Consistency Provisions.

The SELC would need to obtain encroachment and grading permits for work within both the cities of Encinitas and Solana Beach within areas not owned by County DPR or CDFW. Work occurring on County- or state-owned land would not require approvals from the City of Encinitas or Solana Beach pursuant to Government Code Sections 53090 and 53091. Additionally, the cities of Encinitas and Solana Beach have approved LCPs that address potential materials placement sites. Thus, the SELC would apply for a CDP for material placement activities. Alternatively, a consolidated CDP could be requested from the CCC.

Encroachment and use permits for construction activities on properties and ROWs for California State Parks, Caltrans, and NCTD would also be required and the SLC would require a lease agreement for access to lands under their jurisdiction (see Section 1.5).

Lagoon Restoration

Alternative 2A

Land Use

The lagoon currently functions as a coastal wetland and open space/reserve area. Alternative 2A would primarily result in changes to existing channels and habitat distributions within the lagoon. Construction activities (i.e., excavation and dredging) would primarily take place within the boundary of the lagoon and would not result in the permanent conversion of the lagoon from a wetland to another land use post-restoration. The overall existing land use of the lagoon would not change; it would remain a coastal wetland and open space/reserve area. With restoration of the lagoon, the continuation of the lagoon land uses would remain compatible with the surrounding areas and not modify land uses in nearby areas.

Alternative 2A would result in construction of a new tidal inlet located south of the existing inlet, as shown in Figure 2-3. Approximately 1,000 feet of beach may be closed during inlet construction, reaching 500 feet north and south, respectively, of the tidal inlet centerline. Direct use of the beach at the new inlet area would be restricted during the period of inlet construction, estimated to be approximately 6 months. The new inlet would require construction of CBFs on both sides that would extend from Coast Highway 101 perpendicularly onto and under the beach. The new inlet and CBFs would modify the existing beach continuity and existing beach use through permanent conversion of this area to a lagoon inlet; however, it would not substantially alter the continued coastal beach land use of the area. This new inlet area would likely be inaccessible to beachgoers, depending on conditions. Therefore, persons walking on the beach would either wade through the inlet, or pass over the inlet over the new Coast Highway 101 bridge. This same type of condition exists at numerous tidal inlets in the region (San Dieguito, Batiquitos, Santa Ana River, Talbert Channel, and Bolsa Chica). Currently, the existing tidal inlet area at San Elijo is used for swimming and wading activities and is also inaccessible during high tides. Under Alternative 2A, the existing inlet would eventually close, leaving this area consistently accessible to beach users. Beach areas around the existing inlet would remain accessible for public use as the inlet fills in and returns to sandy beach conditions. Essentially, the existing and new tidal inlets would switch land uses; the existing tidal inlet would close and return to fully accessible beach use, while the new tidal inlet would become a swimming and wading area with some inaccessibility during high tide. This would be consistent with the current uses of the Cardiff Beach area in this location and would not result in substantial land use changes or incompatibility.

North-south access along the coast would continue to be provided along Coast Highway 101, so beach users that are not able to cross the inlet on the beach during high tides would still be able to access beach areas on either side of the inlet using the proposed separated pedestrian sidewalk on Coast Highway 101, similar to current conditions. Thus, horizontal access across the beach area would be maintained. In addition, the beach areas on either side of the new inlet would have additional material placed from restoration implementation (300,000 cy) and periodic enhancement from maintenance dredging, which could enhance this beach. The new inlet and CBFs would be considered a change from existing conditions; however, sufficient beach area for continued recreational use would be available on both sides of the inlet and north-south access would be maintained both during and after construction. Therefore, overall beach use and access in the area would not be substantially restricted.

A new bridge along Coast Highway 101 would be constructed to span the new inlet location. Construction of the new Coast Highway 101 bridge would result in the temporary closure of two highway lanes. However, roadway capacity would be restored upon completion of the new bridge, and north-south access along the highway and to the neighboring commercial establishments would be maintained during construction (PDF-43, PDF-44 and PDF-45). In addition, upon completion of the new bridge, a pedestrian walkway/bicycle path would be incorporated on the west side of the highway to allow beach users to continue to access the beach both north and south as shown in Figure 2-5.

Railroad operations and service would be maintained throughout construction unless otherwise arranged with NCTD and would not be substantially disrupted by SELRP restoration activities. Restoration and maintenance of the lagoon would not affect future railroad services or operations within the NCTD ROW. This would allow for the continuation of the railroad to provide coastal access in accordance with requirements of Chapter 3 of the CCA.

Construction staging and access areas shown in Figure 2-15 would be returned to their previous conditions after construction (PDF-46). As shown in Figure 2-15, several staging areas would be used for periodic maintenance dredging activities occurring once every 3 to 4 years requiring approximately 5 months to complete. One onshore staging area is located on the west side of Coast Highway 101 (south of The Chart House restaurant). Periodic maintenance activities would require temporary use of this beach area for sand placement; however, no structures or equipment would be left there permanently and the area would be restored to its beach condition upon completion of maintenance activities. Other staging and access areas used for maintenance activities are located within the lagoon and would not permanently change or strain nearby uses. While the land use of these staging areas would be modified during construction or maintenance periods, such as the conversion of beach area to an inaccessible staging area, these temporary construction-related impacts would not result in the permanent conversion of the current use into a different use or create substantial land use conflicts or inconsistencies. Post-construction impacts related to conversion of land use are also not anticipated as the areas would be restored to their original conditions.

For the reasons detailed above, impacts associated with the permanent conversion of land to other uses that would strain nearby or existing uses would be **less than significant (Criterion A). No substantial adverse impacts have been identified.**

As previously described, restoration activities would not change the existing nature of the lagoon or substantially alter existing land uses in surrounding areas. However, during construction, nearby residences and businesses may experience temporary indirect construction-related impacts associated with traffic and/or noise, which could cause incompatibilities with surrounding land uses (refer to Sections 3.10 and 3.12, respectively, for detailed analysis of these impacts and minimization measures to help address the effects). In addition to the traffic and noise minimization measures, project design features require implementation of a public information program to assist nearby residents in understanding the purpose of the project would help to reduce impacts related to land use incompatibilities during construction (PDF-1). This would include posting aesthetically appropriate signs at several key areas around the lagoon identifying that restoration is in progress, and providing the project's website address so interested parties could learn more about project activities, purpose, and schedule (PDF-2). By providing project information as required in PDF-1 and PDF-2, the public would be able to understand the duration and purpose of the construction and associated impacts; prepare for the disruptions as necessary, such as learn and understand the traffic rerouting prior to implementation; and provide the public with contact information to ask questions or submit suggestions or complaints as the project is ongoing. Providing the public this information would help to minimize potential land use incompatibilities with nearby residential, recreation, and commercial uses during construction. Upon completion, the enhanced and restored wetland would continue to be compatible with adjacent residential uses and the nearby beach and commercial areas. Lagoon restoration would also indirectly benefit surrounding land uses by improving public passive recreational use and educational opportunities through enhancement of the habitat supporting the abundant flora and fauna species within the lagoon; the main attraction for lagoon visitors. **Impacts would be less than significant (Criteria B and C). No substantial adverse impacts have been identified.**

The project area is identified in City and County planning documents as an area to be preserved and protected as open space and passive recreational use. As shown in Table 3.1-1, Alternative 2A would not alter the lagoon's use or function in a manner inconsistent with applicable regulations and laws or existing and future local land use plans. As shown by the laws, plans, and policies listed in Table 3.1-1, many of the land use regulations applicable to the project study area are geared toward the conservation, preservation, and restoration of the lagoon area and associated coastal, biological, and recreational resources. Alternative 2A would serve to enhance lagoon function and associated flora, fauna, and other recreational assets enjoyed by the public and protected by land use regulations. The overall lagoon restoration resulting from Alternative 2A would not cause conflicts with land use regulations or policies that could result in substantial adverse environmental effects. Thus, **impacts would be less than significant (Criteria B and C). No substantial adverse impacts have been identified.**

Table 3.1-1
Lagoon Restoration: Consistency with Applicable Land Use Regulations, Plans, or Programs

Applicable Regulation, Law, Plan, or Program	Project Consistency
FEDERAL	
Coastal Zone Management Act	Consistent: Project activities are regulated by Local Coastal Programs implemented by local agencies.
STATE	
California Coastal Act (CCA)	Consistent: In accordance with Section 30233 (a)(6) of the CCA, restoration activities are regulated by Local Coastal Programs implemented by local agencies. Consistency Certification, Section 30600(a) of the CCA, or Waiver of Federal Consistency Provisions would need to be granted by the CCC.
Marine Life Protection Act	Consistent: San Elijo Lagoon is a designated State Marine Conservation Area. Restoration activities are permitted pursuant to California Code of Regulations Title 14, Section 632 subsection (b)(117)(D).
California State Lands Commission Public Trust Doctrine	Consistent: The new tidal inlet and associated cobble blocking features under Alternative 2A would change the beach continuity but would not eliminate public access to the broader beach. An agreement would need to be reached between the SLC and California Department of Parks and Recreation for the portion of the State Beach that would be occupied by the tidal inlet.
California Code of Regulations, Title 14, Section 630(b)(103) - Ecological Reserve	Consistent: The lagoon restoration would not change or modify the lagoon’s designation, purpose, or public use as an ecological reserve as designated in Section 630(b)(103) and would be consistent with the general regulations set forth for ecological reserves.
San Diego Coastal State Park General Plan – Cardiff State Beach	Consistent: Cardiff State Beach General Plan supports actions to enhance tidal exchange and ecological functions at San Elijo Lagoon.
LOCAL	
City of Encinitas General Plan and Local Coastal Program Land Use Plan (LCP LUP)	Consistent: San Elijo Lagoon is designated as Ecological Resource/Open Space/Parks. Lagoon restoration activities would not change current use or function or result in incompatibilities with surrounding land use. In addition, the General Plan includes policies that permit dredging of wetlands for restoration purposes (Policy 10.6) and specifically identifies the need to implement an integrated management plan for the long-term conservation and

Applicable Regulation, Law, Plan, or Program	Project Consistency
	restoration of wetland resources at San Elijo Lagoon (Policy 10.10) (City of Encinitas 2009).
City of Solana Beach General Plan and Local Coastal Program Land Use Plan Local Implementation Plan (LCP LUP LIP)	Consistent: Solana Beach General Plan and the LCP LUP LIP encourage and support efforts to restore San Elijo Lagoon in coordination with applicable resource management agencies (Policy 3.59) (City of Solana Beach 2009).
County of San Diego General Plan and San Dieguito Community Plan	Consistent: The San Dieguito Community Plan, part of the San Diego County General Plan, lists San Elijo Lagoon as a Resource Conservation Area and supports its current recreational use. That recreational use would continue with the SELRP and new trail connections would replace the trail on the dike.
Escondido Creek Watershed Restoration Action Plan	Consistent: Achieves the objectives and goals of this plan related to restoration of San Elijo Lagoon.
San Elijo Lagoon Area Enhancement Plan	Consistent: Achieves the objectives and goals of this plan.
San Elijo Lagoon Action Plan	Consistent: Achieves the objectives and goals of this plan.

Recreation

Trails

Existing trails totaling 7 miles are located within the lagoon, as shown in Figure 3.1-1. These trails are used for walking, running, bird watching, nature observations, and educational purposes. During construction, portions of the lagoon would be flooded to mobilize and operate necessary construction equipment within the lagoon and provide adequate water depth for dredge operations (refer to Section 2.10). In addition, certain trails would be used for access to the site and staging areas (Figure 2-15); therefore, public access and use of some trails would be temporarily restricted during construction to maintain public safety (PDF-5). Some existing trail access would remain available throughout construction, however, to maintain public access to the Reserve (PDF-6). Table 3.1-2 describes how each trail would be impacted both during construction and post-project for the proposed project and alternatives.

Table 3.1-2
Trails Impacted during and after Project Construction

Trail Name	2A Construction Impact (Temporary)	2A Post-Project Implementation (Permanent)	1B	1A
Nature Center Loop	Project activities would not occur on this trail. While portions of the lagoon near this trail would be flooded to allow for mobilization and operation of construction	Trail access and condition would remain the same as pre-project. **No significant or adverse permanent impacts would occur.**	Construction: Same as Alternative 2A. **No significant or adverse temporary impacts would**	Construction: Same as Alternative 2A; no adjacent flooding would be required. **No significant or**

Trail Name	2A Construction Impact (Temporary)	2A Post-Project Implementation (Permanent)	1B	1A
	equipment, this trail would remain dry and accessible during project construction. **No significant or adverse temporary impacts would occur.**		**occur.** Post-Project: The Nature Center Loop would be connected to the North Rios Avenue Trail in the central basin via a new east-west connection. This would add 0.25 mile of trails to the current system and provide additional connectivity through the lagoon. **No significant or adverse permanent impacts would occur.**	**adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would occur.**
North Rios Avenue Trail	Portions of the North Rios Avenue Trail west of the trailhead and parallel to the NCTD railroad would be restricted during lagoon restoration activities as this area would serve as site access during construction. The trail functions currently as a utility access road along the central basin and would be temporarily restricted to maintain public safety. The North Rios overlook that extends into the lagoon would be needed as a construction staging area and would also be temporarily closed throughout the duration of construction (3 years). However, other existing trail access would remain available throughout construction to maintain public access to the Reserve. Thus, **this temporary impact is considered less than**	A portion of this trail parallel to the NCTD railroad would be permanently eliminated for construction of the new inlet, as shown in Figure 3.1-1. This would remove trail access north of the new inlet area permanently. In addition, the area of the trail/access road that parallels the adjacent homes would be permanently widened as part of the SELRP, but post-project access and use would not be precluded. The remainder of the trail, including the overlook, would be returned to its original condition and access would be restored to pre-project conditions. While the northern end of the trail would be eliminated, a majority of the trail would remain available, including the overlook. **Thus, permanent impacts would be less than significant and no adverse impacts would occur.**	Construction: Same as Alternative 2A. **This temporary impact is considered less than significant and not adverse**. Post-Project: The trail, including the overlook, would be returned to its original condition and access would be restored to pre-project conditions. Additionally, this trail would be connected to the Nature Center Loop via a new east-west connection, enhancing trail connectivity through the lagoon. **Thus, permanent**	Construction: Same as Alternative 2A. Although the overlook would not be required as a staging area during construction of Alternative 1A, access would be temporarily restricted during construction since the trail/access road would be used by construction equipment. **This temporary impact is considered less than significant and not adverse**. Post-Project: The trail would be returned to

Trail Name	2A Construction Impact (Temporary)	2A Post-Project Implementation (Permanent)	1B	1A
	significant and not adverse.		**impacts would be less than significant and no adverse impacts would occur.**	its original condition and access would be restored to pre-project conditions. **Thus, permanent impacts would be less than significant and no adverse impacts would occur.**
Solana Hills Trail	Portions of the Solana Hills Trail along the edge of the flooding boundary just west of I-5, as shown in Figure 3.1-1, would be inundated and access restricted for approximately 12 months during construction. However, the upland portions of the trail would not be impacted and access along the east side of the central basin would be maintained. Thus, **this temporary impact is considered less than significant and not adverse**.	Trail would be returned to its original condition and access would be restored to pre-project conditions. No permanent loss of recreational uses would occur. **No significant or adverse permanent impacts would occur.**	Construction: Same as Alternative 2A. **This temporary impact is considered less than significant and not adverse**. Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would occur.**	Construction: Flooding would not be required as part of Alternative 1A, and the trail would not be impacted during construction. **No significant or adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would occur.**
Santa Inez Trail	A portion of the Santa Inez Trail parallel to I-5 in the east basin would be used for construction access and staging activities. Portions of the trail would be restricted for approximately 18 months during construction as shown in Figure 3.1-1. However, other existing trail access would remain available throughout construction to maintain public access to the Reserve. **Thus, this temporary impact is**	Trail would be returned to its original condition and access would be restored to pre-project conditions. No permanent loss of recreational uses would occur. **Permanent impacts would be less than significant and no adverse impacts have been identified.**	Construction: Same as Alternative 2A. **This temporary impact is considered less than significant and not adverse**. Post-Project: Same as Alternative 2A. **Permanent impacts would be less than significant and no adverse**	Construction: Same as Alternative 2A. **This temporary impact is considered less than significant and not adverse**. Post-Project: Same as Alternative 2A. **Permanent impacts would be less than**

Trail Name	2A Construction Impact (Temporary)	2A Post-Project Implementation (Permanent)	1B	1A
	considered less than significant and not adverse.		**impacts have been identified.**	**significant and no adverse impacts have been identified.**
Santa Carina Trail	Project activities would not occur on or near this trail and no access restrictions would be needed. **No significant or adverse temporary impacts would occur.**	Trail access and condition would remain the same as pre-project. **No significant or adverse permanent impacts would occur.**	Construction: Same as Alternative 2A. **No significant or adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would occur.**	Construction: Same as Alternative 2A. **No significant or adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would occur.**
Santa Helena Trail	Project activities would not occur on or near this trail and no access restrictions would be needed. **No significant or adverse temporary impacts would occur.**	Trail access and condition would remain the same as pre-project. **No significant or adverse permanent impacts would occur.**	Construction: Same as Alternative 2A. **No significant or adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would occur.**	Construction: Same as Alternative 2A. **No significant or adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would occur.**
La Orilla Trail	Project activities would not occur on or near this trail and no access restrictions would be needed. **No significant or adverse temporary impacts would occur.**	Trail access and condition would remain the same as pre-project. **No significant or adverse permanent impacts would occur.**	Construction: Same as Alternative 2A. **No significant or adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would**	Construction: Same as Alternative 2A. **No significant or adverse temporary impacts would occur.** Post-Project: Same as Alternative 2A. **No significant or adverse permanent impacts would**

Trail Name	2A Construction Impact (Temporary)	2A Post-Project Implementation (Permanent)	1B	1A
			occur.	**occur.**
Dike Trail	The Dike Trail would be used as an access and staging area during construction. Access to and use of this trail would be eliminated after Phase 1. However, alternative trail access would remain available throughout construction to maintain public access to the Reserve. **Thus, this temporary impact is considered less than significant and not adverse.**	The Dike Trail would be removed permanently under Alternative 2A. However, north-south trail access across the east basin from Manchester to the Santa Inez Trail would be restored through efforts underway by Caltrans as part of the construction of an enhanced trail connection for the I-5 North Coast Corridor Project as shown in Figure 3.1-1 and described further in the paragraph below this table. While loss of the Dike Trail would occur, its removal would further expand tidal exchange and enhance the ecological function within the lagoon. Since north-south access would not be precluded through the Reserve due to the enhancements and connection to another nearby trail, **Permanent impacts are considered less than significant and not adverse.**	Construction: Same as Alternative 2A. **This temporary impact is considered less than significant and not adverse.** Post-Project: Same as Alternative 2A. **Permanent impacts are considered less than significant and not adverse.**	Construction: Same as Alternative 2A. **This temporary impact is considered less than significant and not adverse.** Post-Project: The Dike Trail would remain available for public use. Two cuts in the dike would occur to improve water circulation; however, these cuts would occur below the surface and the trail would remain intact upon completion of restoration activities. P**ermanent impacts are considered less than significant and not adverse.**

As described in Table 3.1-2, construction-related impacts would temporarily restrict access and use of portions of the North Rios Trail and Overlook, Solana Hills Trail, and the Santa Inez Trail. The Dike Trail would be accessible during Phase 1 of construction and then would be eliminated permanently. However, construction of the project could not occur without use of these trail areas, and use and access restrictions are necessary to maintain public safety. Access to portions of these trails that are not being used for construction or staging would be maintained throughout project construction. Additionally, other existing trail access would remain available throughout construction to maintain public access to the Reserve. Access to the Nature Center would be maintained from the existing parking lot (PDF-6). Upon project completion, North Rios, Solana Hills, and Santa Inez trails would be returned to their original condition and access to them would be restored to pre-project conditions (PDF-47). Thus, temporary impacts related to recreational trail loss are considered **less than significant (Criterion D) and not substantially adverse.**

Indirect impacts to trail recreation could occur during construction activities such as increased dust and noise and the temporary reduction in visible habitat and wildlife species. These types of indirect impacts would be fairly localized in the immediate vicinity of construction activities and would cease with the completion of construction. Trails in various areas of the lagoon would be open for public access throughout the duration of construction, allowing for avoidance of trails that may be near construction areas. In addition, in the long term, the lagoon restoration would result in increased ecological diversity within the lagoon to be experienced by bird watchers, nature enthusiasts, and recreationists. Thus, temporary or permanent indirect impacts related to recreational trail use are considered **less than significant (Criteria D and E) and not substantially adverse.**

Access and use of a portion of the North Rios Avenue Trail north of the new inlet would be permanently lost with implementation of Alternative 2A. Public use of this trail north of the new inlet location would be eliminated to construct the opening for the new inlet, but areas south of the inlet crossing would be restored to public access at the completion of construction.

The Dike Trail would be permanently removed upon project completion. The removal of the Dike Trail would not decrease emergency access, or eliminate an existing emergency access route, as the dike was not constructed to provide vehicle access and, because of the sandy nature of the trails on the south side, would not be suitable for typical emergency vehicles such as fire engines, ambulances, or patrol cars. A variety of existing access points would continue to service the lagoon, including four different entry points on the southern side of the east basin: Santa Inez, Santa Florensia, Santa Helena, and the La Orilla trailheads.

While the Dike Trail would be eliminated, north-south trail access across the east basin from Manchester Avenue to the Santa Inez Trail would be restored through efforts underway by Caltrans as part of the construction of an enhanced trail connection associated with the I-5 North Coast Corridor Project as shown in Figure 3.1-1. Caltrans would construct an enhanced trail connection consisting of streetscape improvements and trail improvements that connect into the existing lagoon trail system. Caltrans and SANDAG would connect the north and south sides of the lagoon via a new bike/pedestrian suspended bridge adjacent to the I-5 highway bridge. Additionally, an improved trail segment underneath the I-5 highway bridge would provide better east-west movement (SANDAG 2013). This improved segment along the south side of Manchester Avenue would include a new pedestrian-friendly streetscape linkage to the proposed pedestrian bridge that would be suspended under the west side of I-5. This bridge would extend north to south and would connect to a new trail under I-5 on the south side of the lagoon that would provide connection to existing trails on the west and east sides of I-5 (Santa Inez Trail). Additionally, as part of the I-5 North Coast Corridor Project PWP/TREP, the planned I-5 North Coast Bike Trail would be installed along the south side of Manchester Avenue, exiting from the new I-5 bridge to points north of the lagoon. This bike trail would provide bicycle connectivity to the Nature Center (SANDAG 2013). These improvements would serve to complement and enhance the existing trail system within the lagoon and enhance coastal access. Additionally, the Final I-5 North Coast Corridor EIR/EIS states in the land use section that access to existing trailheads and designated trails in the Reserve would be unaffected (Caltrans 2013). While loss of the Dike Trail would occur, north-south access would not be precluded and would be maintained via the aforementioned enhancements as trail users could access the new I-5 bridge trail from Manchester Avenue and link to the Santa Inez trail system that provides connection to trails in the southern portion of the lagoon on both the east and west sides of I-5 as shown in Figure 3.1-1. Thus, permanent impacts related to recreational trail loss are considered **less than significant (Criterion E) and not substantially adverse.**

Beach

As previously described, Alternative 2A would result in construction of a new tidal inlet and supporting CBFs would be needed to maintain inlet stability in this new location. During construction, the beach area approximately 500 feet north and south of the new tidal inlet would be closed to public access and recreation for a 6-month period. While this closure would reduce beach area, other areas of the beach would still be accessible and enough beach space would be available to accommodate the needs of beachgoers (PDF-6). Upon project completion, it is anticipated that no substantial net change in accessible beach area would occur from this alternative because the existing tidal inlet channel would close and be replaced with the new channel, plus nourishment may widen the beach from existing conditions. Maintenance dredging activities may result in closure of a short reach of beach (500 feet) over a period of 5 months every 3 to 4 years for sand placement but adjacent beach areas would remain open. Beach staging areas associated with maintenance activities would be restored to their previous beach condition at the conclusion of the periodic maintenance work. Access conditions would be similar to existing conditions, with the channel shifted south along the beach. Also, as previously described, sufficient stretches of beach would exist on both sides of the inlet so that overall beach use in the area would not be substantially altered. Access to cross over the inlet would be provided by the new Coast Highway 101 bridge, and walking along the water’s edge to cross the inlet could still occur depending on tidal conditions. Negative effects related to recreation opportunities are perpetuated by the degradation of water quality (e.g., elevated bacteria levels) in the lagoon and adjacent to the lagoon mouth, leading to beach closures during moderate to large storm events that flush accumulated bacteria to the ocean. Lagoon restoration would reduce the potential for this occurrence. Therefore, **permanent impacts related to recreation loss at**

nearby beach areas would be less than significant (Criterion E). No substantial adverse indirect impacts have been identified.

Temporary staging and stockpile areas may be located around the perimeter of the lagoon or on the beach. These sites could include areas designated for pipe and equipment stockpiling and could also be fenced for public safety, as required. These temporary use areas would not impede the use of surrounding beach areas and would not be of the magnitude to cause a shortage of available beach area for recreationalists. The temporary staging areas would be fully removed when the associated construction activity is complete. Therefore, **temporary impacts related to recreation loss at nearby beach areas would be less than significant (Criterion D). No substantial adverse indirect impacts have been identified.**

Surfing

Popular surfing spots located within the immediate vicinity of the lagoon include George's, Cardiff reef, and Seaside reef. Impacts to the surfing environment associated with constructing a new inlet and associated CBFs, as well as closing the existing inlet, are discussed in detail in the following paragraphs.

Constructing a new tidal inlet and associated CBFs for Alternative 2A would require closure of a working area along Cardiff Beach south of the George's surf spot. The new inlet location is away from existing surf spots and would therefore not impact existing surfing activities during construction. Approximately 1,000 feet of beach total may be closed during the 6-month inlet construction period, reaching 500 feet north and south, respectively, of the tidal inlet centerline (entirely south of George's). Closure of the beach would not preclude surfing off the inlet location, and surfing could still occur along Cardiff Beach. Closure of the 1,000-foot length of beach would temporarily restrict access by foot to the water, but surfers would be able to access the water from both north and south of the inlet construction area.

Another construction-related effect could include turbidity generated during excavation of the inlet. Excavation would be done "in the dry" from land using excavators and can be controlled sufficiently to prevent turbidity from entering the ocean; surfing should not be affected. The actual opening of the inlet would result in short-term water quality changes immediately off of the mouth, which could impact water quality for a very short duration (less than a day) as observed at Bolsa Chica State Beach during inlet opening in 2006 (Webb 2013) and would not cause substantial loss of local surfing opportunity.

Post-construction impacts from the project may include changes to bathymetry; installation of a new channel, CBFs, and an ebb bar; effects to access; and closure of the existing tidal inlet.

Installing a new tidal inlet along Cardiff State Beach could improve surfing conditions at the inlet location after construction is complete. Installing a channel through a straight beach can break up the bathymetry and cause new sand bars to form, thus improving the surf. Closure of the existing inlet should not impact the surf break as the existing mouth was closed throughout the 1980s and 1990s prior to the present maintenance regime, and high-quality surfing remained throughout that time (M&N 2014). Several new inlets have been constructed/enhanced in southern California over the last 30 years, including Bolsa Chica (2006), Batiquitos Lagoon (1996), Huntington Beach Wetlands (1990), and San Dieguito Lagoon (2010). Surfing conditions have improved at several new tidal inlets, with none causing long-term significant impacts to surfing (M&N 2014).

Creating a break (physical gap) for an inlet in the relatively straight-lined bathymetry at this type of site can actually lead to more rideable surf than presently exists. This is evident when considering the other inlets listed above. Each site now is characterized by rideable surf with relatively high-quality surfing under certain conditions. Waves often break toward the inlet channel and can be ridden to the deeper water area off the channel. The offshore extent of the channel can then provide an opportunity to paddle back out to the line-up (area to sit and wait for waves).

In addition, creation of an ebb bar offshore would most likely produce at least a moderate-quality wave, or an even better-quality wave than presently exists. Ebb bars typically form a peak with shoulders for a right and left off of the bar, with the quality dependent on the sand quantity in the bar. The ebb bar would be a permanent feature and would therefore provide a rideable wave potentially throughout the year. Therefore, surfing along Cardiff State Beach could improve at that location from installation of a new tidal inlet and ebb bar.

The CBFs are too short and close to shore to affect surfing because they are on the beach. Surfing would occur offshore of the CBFs, and surfers should not experience interference from the CBFs. The CBFs are designed to not trap sand, but to block cobble, so bathymetry should not change from the CBFs and surfing should also not be affected. Access to the beach by surfers should not be affected by either the tidal inlet or CBFs because access to the surf would be provided up and down the coast on both sides of the inlet.

Potential effects to surfing could occur from ebbing tidal currents from the wetlands to the ocean, as well as rip tides that form along the channel. Ebbing tides would generate relatively strong currents that would interrupt surfing off the mouth during short periods, and would cause an offshore drift that surfers would have to paddle through to pass across the inlet mouth. Surfers may be able to use the ebbing tidal current as enhanced paddle access to the line-up. Surfing near an inlet mouth typically occurs relative to tides, with peak ebbing tides being a time that might be avoided due to currents. The current would be higher during certain periods (a couple of hours during peak ebb tides twice a month). However, the magnitude of the increase is not sufficient to impact surfing activity, the current is directed away from the primary surf spot, and there is already a high ebbing current under the same conditions. Other periods of the tides can generate relatively good surfing conditions (slack and incoming tides).

Access to surf sites would not be substantially impacted by the project, as parking would be provided along Coast Highway 101 (west shoulder) as exists today, with the exception of on the bridge over the inlet channel. Beach access is provided over the sand, and surfers can fairly easily paddle or wade through the inlet channel, as occurs at the existing tidal inlet channel at the existing tidal inlet. No substantial net change in accessible beach area would occur under this alternative because the existing tidal inlet channel would eventually close under this scenario and be replaced with the new channel and inlet area. Access conditions would be similar to existing conditions, with the channel shifted south along the beach.

Closure of the existing tidal inlet to create a new tidal inlet for Alternative 2A could potentially cause impacts from reduced tidal flow, lack of scour along reef edge, and potential effects on bathymetry. Tidal flow currently issues from the mouth of San Elijo Lagoon just south of the Cardiff Reef and north of George's surf spot. Tidal flow out of the lagoon (ebbing tides) results in a rip current. Current velocities were modeled as part of the SELRP project hydrodynamics study (M&N 2010). Model results show that the velocity of the current is relatively low because tidal flow "fans out" after issuing from the inlet channel into the nearshore ocean. Relatively fine-grained sediment in suspension from the lagoon or inlet may be able to remain in suspension to the nearshore zone, but it eventually settles out or is carried by ocean currents elsewhere. Existing ebb tidal flow velocities in the nearshore are insufficient to suspend sand from the seabed. Sand becomes suspended from the nearshore seabed by forces exerted by breaking waves and wave-driven currents, which would not change from the project due to no change in bathymetry and wave exposure. Existing conditions do not appear to include substantial scour along the south edge of Cardiff Reef under normal conditions. Extreme conditions of high storms draining from the lagoon coincident with ebbing spring tides may result in scour in the beach and nearshore but do not appear to be a controlling factor for existing bathymetry. The wave breaking pattern at Cardiff Reef does not appear different between conditions of a closed and open tidal inlet, as evidenced by historical aerial photographs (M&N 2014). These data support the conclusion that the bathymetry of Cardiff Reef is not controlled or affected substantially by the condition or location of the inlet, but rather by the bedrock foundation of the reef and littoral sand transport patterns. In addition, the position of the ebbing current jet is typically south of the surf spot and not in direct connection with the path of the wave rider. Reducing the ebbing current would not likely affect the bathymetry of Cardiff Reef and surfing. Overall, **surfing-**

related impacts under Alternative 2A would be less than significant (Criteria D and E) and not substantially adverse.

As a project design feature (PDF-73), surf condition monitoring is included in focused areas as part of the project to verify the modeling results and document the anticipated lack of change in surf conditions. The data collected during monitoring would be useful in future analysis of projects that may modify the shoreline and provide baseline information regarding the coastal processes in the Cardiff Reef area.

Alternative 1B

<u>Land Use</u>

Alternative 1B would retain the existing inlet location, and restoration efforts would primarily consist of widening existing channels to improve hydraulic functions and increase habitat distributions within the lagoon. Restoration activities would require staging and access areas as shown in Figure 2-15; however, as stated in the analysis for Alternative 2A, areas used for construction activities would be returned to their previous conditions after construction to the greatest extent possible. These construction activities would be temporary and would not permanently change or strain nearby uses. Alternative 1B would result in improvements to the existing inlet and would not introduce new structures in the onshore environment. No permanent conversion of lands to other uses would occur and the proposed project would not strain or conflict with surrounding land uses. Construction activities may cause temporary incompatibilities with surrounding land uses related to noise and traffic impacts; however, as stated in the analysis for Alternative 2A, those impacts would be addressed by traffic and noise measures as described in Sections 3.10 and 3.12, as well as implementation of a public information program (PDF-1). As shown in Table 3.1-1, restoration activities are consistent with applicable land use regulations and plans and would not cause adverse environmental effects related to land use. Land use impacts resulting from implementation of Alternative 1B **would be less than significant (Criteria A, B, and C) and not substantially adverse.**

<u>Recreation</u>

Trails

Alternative 1B would result in similar impacts to recreation opportunities within the lagoon as described above for Alternative 2A related to trails. Temporary closures of certain trails would occur, and the Dike Trail would be eliminated; however, alternative trail access would remain open and north-south access across the east basin would be restored via improvements made by the I-5 North Coast Corridor Project. As described for Alternative 2A, temporary impacts related to recreational trail loss are considered **less than significant (Criterion D) and not substantially adverse.**

Implementation of Alternative 1B would include the construction of a new trail in the central basin, as shown in Figure 3.1-1. This trail would establish an east-west connection from the North Rios Avenue Trail that parallels the NCTD railroad (also currently serves as a utility access road) to the Nature Center Loop. This enhancement would also provide for additional north-south access via this trail from the Nature Center Loop to the North Rios trailhead. This would add 0.25 mile of trails to the current system and would provide a link between the south and north sides of the central basin. Upon project completion, impacted trails would be returned to their original condition and access to them would be restored to pre-project conditions, with the exception of the Dike Trail. As described above, north-south access across the east basin would be restored via a pedestrian bridge as part of the I-5 North Coast Corridor Project. **Permanent impacts related to recreational trails under 1B are considered less than significant (Criterion E) and not substantially adverse.**

Similar to Alternative 2A, indirect impacts such as dust, noise, or loss of wildlife observation along trails could occur but would be fairly localized in the immediate vicinity of construction activities and would cease with the completion of construction. In addition, in the long term, lagoon restoration would result in increased ecological diversity within the lagoon to be experienced by bird watchers, nature enthusiasts, and recreationists. Thus, temporary or permanent indirect impacts related to recreational trail use are considered **less than significant (Criteria D and E) and not substantially adverse.**

Beach

Beach use in the area would not be substantially altered under this alternative since the existing inlet would be retained and improvements would be minimal at the inlet. Lagoon restoration would reduce the potential for lost recreation opportunities due to degradation of lagoon water quality and resulting beach closures. **Permanent impacts to beach use would not be substantially adverse and would be less than significant (Criterion E).**

Similar to Alternative 2A, temporary staging and stockpile areas may be located around the perimeter of the lagoon or on the beach. These temporary use areas would not impede the use of surrounding beach areas and would not be of the magnitude to cause a shortage of available beach area for recreationalists. The temporary staging areas would be removed when the associated construction activity is complete and the beach area restored. **Therefore, temporary**

impacts related to recreation loss at nearby beach areas would be less than significant (Criterion D). No substantial adverse indirect impacts have been identified.

Surfing

Alternative 1B would increase the tidal prism of the lagoon and consequential tidal discharge through the inlet. Increasing the tidal discharge via the existing tidal inlet has the potential to cause increased turbulence on the ocean surface at the Cardiff Reef surf spot if the currents interact with waves in a particular manner. Turbulence could be caused if the ebbing current was directed into the wave shoulder, or toward the take-off zone of the wave at Cardiff Reef. The current interaction with the wave could cause chop on the surface and decrease the wave quality. This type of condition exists at certain inlets (e.g., Ocean Beach Jetty in San Diego) under certain spring tidal conditions and can diminish the wave form and shape. However, observations at Cardiff Reef indicate that the ebbing current is directed more to the southwest and away from the surfing shoulder on the right at Cardiff Reef. Also, the variation in tidal current velocities is relatively low and should not change the existing pattern of the ebbing tide. Therefore, it is not anticipated that Alternative 1B would cause different current/wave interaction, and a decrease in the wave form and quality at this reef is not anticipated.

Alternative 1B would not preclude the viability of recreational activities during construction and would not result in a major loss of recreational uses. Alternative 1B would also not result in the permanent and major loss of recreational use areas or major conflicts with adjacent recreational uses in the post-construction period, including surfing. **Recreation impacts related to surfing would not be substantially adverse and would be less than significant (Criteria D and E).**

Alternative 1A

<u>Land Use</u>

Please refer to the land use analysis provided above for Alternatives 2A and 1B. Alternative 1A would require fewer construction or flooding activities, structures such as the bridges would be maintained, and the existing inlet would be retained; thus, there would be minimal potential for land use conflicts or incompatibilities as a result during the temporary construction phases. These construction activities would be temporary and would not permanently change or strain nearby uses. Alternative 1A would not introduce new structures in the onshore environment. Similar to Alternative 1B, land use in the area would not be substantially altered under Alternative 1A since the existing inlet would be retained in its current location and improvements would be minimal at the inlet.

The lagoon would undergo moderate changes and restoration relative to Alternatives 2A and 1B and would result in long-term conditions that are generally similar to the existing conditions. The overall existing land use of the lagoon would not change with implementation; it would remain a coastal wetland and open space/reserve area. As shown in Table 3.1-1, restoration activities are consistent with applicable land use regulations and plans and would not cause adverse environmental effects related to land use. The continuation of the lagoon land uses would remain compatible with the surrounding areas and would not result in a change or modify land uses in nearby areas. **Temporary or permanent land use impacts resulting from implementation of Alternative 1A would be less than significant (Criteria A, B, and C) and not substantially adverse**.

Recreation

Trails

Under Alternative 1A, restoration activities would primarily occur within the main channel. Phased flooding of the lagoon for construction purposes would not occur under Alternative 1A. Two existing trails would require temporary access and use restrictions during construction. The Dike Trail would remain largely intact. Two cuts in the dike would occur to improve water circulation in this area; however, these cuts would occur below the surface and the trail would remain intact upon completion of restoration activities. The dike would be used for construction staging and access may be temporarily restricted during construction. The North Rios Avenue Trail and overlook would be used for site access and staging, so recreation access would be temporarily restricted during construction. Other existing trail access would remain open. Thus, **temporary recreational trail impacts would be less than significant (Criterion D) and not substantially adverse**.

Alternative 1A would not result in the permanent loss of existing trails and **no permanent substantial adverse or significant impacts (Criterion E) would result.**

Beach

Similar to Alternative 1B, beach use in the area would not be substantially altered under Alternative 1A since the existing inlet would be retained and improvements would be minimal at the inlet. **Permanent impacts to beach use would not be substantially adverse and would be less than significant (Criterion E).**

Similar to Alternatives 1B and 2A, temporary staging and stockpile areas may be located around the perimeter of the lagoon or on the beach. These temporary use areas would not impede the use of surrounding beach areas and would not be of the magnitude to cause a shortage of available beach area for recreationalists. The temporary staging areas would be removed when the associated construction activity is complete. Therefore, **temporary impacts related to recreation loss at nearby beach areas would be less than significant (Criterion D). No substantial adverse indirect impacts have been identified.**

Surfing

Surfing impacts under this alternative would be similar to or less than those described for Alternative 1B. Less tidal flow would occur with Alternative 1A than with Alternative 1B; therefore, the potential for turbulence resulting from ebbing currents would be less. Potential impacts to surfing under Alternative 1A would be less than significant. Alternative 1A would not preclude the viability of recreational activities during construction that result in a major loss of recreational uses. Alternative 1A would also not result in the permanent and major loss of recreational use areas or major conflicts with adjacent recreational uses in the post-construction period. **Recreational surfing impacts would not be substantially adverse and would be less than significant (Criteria D and E).**

No Project/No Federal Action Alternative

Under the No Project/No Federal Action Alternative, no dredging or excavation would occur to improve tidal circulation, clear channels, or improve tidal exchange or upstream flooding. The lagoon inlet would remain in its existing location with ongoing management. No changes to planned land use or incompatibilities with surrounding land uses would occur. Negative impacts related to recreation opportunities could occur under this alternative as no action would perpetuate the degradation of water quality (e.g., elevated bacteria levels) in the lagoon and adjacent to the lagoon mouth, leading to beach closures during moderate to large storm events that flush accumulated bacteria to the ocean. In addition, continued transition of habitats could reduce ecological diversity within the lagoon that is experienced by bird watchers, nature enthusiasts, and recreationists. **Although no new substantial adverse impacts would be anticipated by No Project/No Federal Action Alternative, conditions would continue to decline.**

Materials Disposal/Reuse

Impacts associated with material disposal and reuse would only occur during temporary construction activities. No long-term maintenance or other ongoing activities associated with material disposal would be needed once the material is disposed of or placed for reuse.

Therefore, no long-term or permanent impacts or adverse effects would result from material disposal or reuse.

Alternative 2A

Offshore Stockpiling

Land Use

Materials placement offshore at SO-5 and SO-6 would be an ocean-based activity and would not result in the permanent conversion of land, conflict with existing or future planned land uses, or be incompatible with adjacent land uses. As described in Section 3.1.2, activities in offshore areas are subject to federal and state regulations as well as plans and programs implemented at the local level. The offshore materials placement sites are regulated by the SLC, and a lease would need to be granted for materials placement at SO-5 or SO-6. In addition, MPA regulations covering California's South Coast Study Region were adopted in 2010. SO-6 is included in the Swami's SMCA. While activities in this area are strictly regulated, conditions specific to the Swami's SMCA allow beach nourishment and sediment management activities pursuant to CCR Title 14, Section 632(b)(138)(C) and the materials placement activities would be consistent with all applicable regulations. Therefore, offshore materials placement would not create land use conflict or inconsistencies with existing surrounding land uses or applicable planning document, and **impacts would be less than significant (Criteria A, B, and C). No substantial adverse effects have been identified.**

Recreation

Recreational activities in the ocean include seasonal whale watching, recreational fishing and boating, and snorkeling/scuba. While some restrictions would be in place during placement operations at SO-5 and/or SO-6 (i.e., boaters and recreationists would be restricted from areas directly in the vicinity of pipelines and replenishment equipment), these would be relatively short term in nature (6 months or less) and localized. Boating and recreation activities would not be precluded at the San Diego-La Jolla Underwater Park. Therefore, offshore materials placement would not preclude the viability of recreational activities or result in a permanent and major loss of recreational uses, and **impacts would be less than significant (Criteria D and E). No substantial adverse effects have been identified.**

Nearshore and Onshore Placement

Land Use

Materials placement in the nearshore at Cardiff and onshore on the identified beaches would not result in the permanent conversion of land, conflict with existing or future planned land uses, or be incompatible with adjacent land uses. In fact, local jurisdictions and the CCC have adopted policies and goals specifically in support of a regional approach to sand replenishment and erosion control. Table 3.1-3 provides a discussion of applicable land use regulations, laws, and existing and future local plans for the materials placement component of the SELRP. As shown by the laws, plans, and policies listed in Table 3.1-3, many of the land use regulations applicable to material placement specifically permit or allow material placement for the purpose of coastal protection and enhancement of recreational resources. Other policies act to ensure the protection of biological and coastal resources. Alternative 2A would place surplus material at nearshore or onshore locations in a manner consistent with the applicable laws and regulations. While some environmental impacts would result from actions necessary to implement the SELRP, as discussed throughout the analysis sections of this EIR/EIS, the overall material placement associated with Alternative 2A would not cause conflicts with land use regulations or policies that could result in substantial adverse environmental effects. Overall, beneficial reuse of dredged materials would be consistent with applicable regulations and plans, and **impacts would be less than significant (Criteria A, B, and C). No substantial adverse effects have been identified.**

Table 3.1-3
Materials Placement: Consistency with Applicable Land Use Regulations, Plans, or Programs

Applicable Regulation, Law, Plan, or Program	Project Consistency
FEDERAL	
Coastal Zone Management Act	Consistent: Project activities are regulated by Local Coastal Programs implemented by local agencies.
Marine Protection, Research, and Sanctuaries Act (MPRSA, or Ocean Dumping Act)	Consistent: Under Alternative 1A, dredged materials would be of poor quality (i.e., relatively small grain size) not suitable for reuse and would therefore be disposed of in LA-5. LA-5 is an EPA-designated ocean disposal site that allows dumping of materials from projects in adherence to regulations. LA-5 has the capacity to accept the amount of material that would be generated under this alternative (Ross 2012).
STATE	
California Coastal Act (CCA)	Consistent: In accordance with Section 30233 (a)(6) of the CCA, restoration activities are regulated by Local Coastal Programs implemented by local agencies. Section 30233(b) of the CCA specifies that dredge spoils suitable for beach nourishment should be transported for such

Applicable Regulation, Law, Plan, or Program	Project Consistency
	purposes to appropriate beaches or into suitable longshore current systems. Consistency Certification, Section 30600(a) of the CCA, or Waiver of Federal Consistency Provisions would need to be granted by the California Coastal Commission.
Marine Life Protection Act	Consistent: Moonlight Beach and Cardiff onshore placement sites, as well as offshore SO-6, fall within the Swami's State Marine Conservation Area. Beach nourishment and sediment management are permitted pursuant to California Code of Regulations Title 14, Section 632 subsection (b)(138)(C).
California State Lands Commission Public Trust Doctrine	Consistent: Offshore placement sites SO-6 and SO-5, and nearshore site at Cardiff, are located in ungranted sovereign lands under the jurisdiction of the SLC. A lease is required from the SLC for any portion of a project extending into state-owned lands that are under its exclusive jurisdiction.
San Diego Coastal State Park General Plan	Consistent: General Plans for Leucadia, Moonlight, San Elijo, Cardiff, and Torrey Pines State Beaches support shoreline protection activities, including beach replenishment actions.
LOCAL	
City of Encinitas General Plan and Local Coastal Program Land Use Plan (LCP LUP)	Consistent: The SELRP would support the Encinitas General Plan and Draft LCP LUP goals of encouraging measures, which would replenish sandy beaches in order to protect coastal bluffs from wave action and maintain beach recreational resources.
City of Solana Beach General Plan and Draft Local Coastal Program Land Use Plan Local Implementation Plan (LCP LUP LIP)	Consistent: The SELRP would support the Solana Beach General Plan and Draft LCP LUP LIP goals to participate in and encourage other long-term beach sand replenishment and retention programs at the federal, state, and regional levels.
City of San Diego General Plan and Local Coastal Program	Consistent: The Torrey Pines placement site is located within the coastal zone as designated by the City of San Diego General Plan (2008). The City's LCP requires any project occurring within the coastal zone to be reviewed by the City and the CCC. This review would occur as part of the SELRP.
Coastal Regional Sediment Management Plan (RSM Plan) and Shoreline Preservation Strategy	Consistent: The SELRP would support the goals of the RSM Plan by allowing for reuse of beach-quality material along the San Diego coastline.

Recreation

There are a variety of recreational activities at nearshore and onshore materials placement sites including snorkeling/SCUBA, recreational fishing, swimming, and general beach use. No beach trails would be affected during material placement activities. During materials placement operations, temporary beach closures would occur on portions of each site; however, following placement of beach-quality materials, recreational beach area would be increased. Because of public safety concerns associated with heavy equipment operations on the beach (i.e., pipelines and dozers to distribute sand on the beaches), portions of each of the disposal/reuse sites would be closed temporarily to the public during construction (PDF-63). The length of beach closure is anticipated to be 500 feet of beach at a time and closures would shift as activities move along the shoreline. Horizontal access along the back beach would be maintained (PDF-70). Pipeline segments would be covered at consistent intervals to facilitate access from the back beach to the water (PDF-71). Where horizontal access is limited, (e.g., where a wet beach directly abuts bluffs), vertical access would remain to allow public access on either side of the active sand placement area as long as public safety is not compromised (PDF-70 and PDF-71). Access restrictions would result in a temporary redistribution of beach activities to adjacent areas.

Ocean areas directly adjacent to sand transport/placement equipment and activities may also be temporarily closed during placement activities to ensure public safety and could briefly disrupt recreation such as snorkeling, SCUBA, or fishing activities in that immediate area (PDF-63). For the safety of recreationalists in the area, barge operations would be coordinated with USCG (PDF-59). Buffers around temporary monobuoys and designated barge lanes would be maintained to avoid water recreation users and vehicle safety hazards (PDF-61 and PDF-62). Additionally, pipelines used during materials transport, including both floating and submerged, would be marked as “navigational hazards” (PDF-60). Adjacent areas around the material placement equipment and activities would remain open throughout the construction period. Once material placement is complete, no residual restrictions or closures of the beach or adjacent ocean area would occur and recreation opportunities would not be permanently affected.

As currently planned, the placement of reuse materials would occur in fall/winter so peak periods of summer use would be avoided. The SELC would coordinate the schedule at individual materials placement sites to the extent possible to avoid major holidays and special events (PDF-68). Ultimately, materials reuse would enhance the public’s sandy beach recreational opportunity and this reuse activity would result in **less than significant impacts to recreation (Criteria D and E) and no substantial adverse effects have been identified**.

Onshore and nearshore materials placement could affect surfing through the following: modification of existing sandbars and reefs by sand placement and deposition, access being denied during construction, poor water quality, or by wave backwash generated during and after construction of the beach fill. Potential impacts at each placement site are consolidated in Table 3.1-4. As described in the table, surf sites within the materials placement footprints can expect to have some increased backwash during high tide immediately during and after construction due to the increased steepness of the design berm, with no long-term change in backwash or wave quality. Some surf locations would benefit from the temporary sand deposition because they are sand-bottom breaks and depend on sand bars for wave quality. Generally, long-term conditions at these surf sites would be maintained as the sand continues to disperse more broadly in the littoral cell. There would be **no significant impacts (Criteria D and E) or substantial adverse impacts to surfing as a result of material placement.**

Table 3.1-4
Summary of Surfing Impacts Related to Materials Disposal/Reuse at Nearshore and Onshore Sites

Site	Modification of Sandbars or Reefs from Sand Deposition	Hindered Access during construction	Reduced Wave Quality from Wave Backwash?
Broad Conclusion	Sand deposition is transient as the transport is constant and the absolute volume of the beneficial reuse material is modest; the long-term impacts would be **less than significant and not substantially adverse.**	Approximately 1,000 feet of beach total may be closed during fill construction, reaching 500 feet north and south, respectively, of the beach fill template centerpoint. Closure of the beach does not constitute a prohibition to surfing off the placement site location, and surfing could still occur along these beaches. Closure of the 1,000-foot length of beach would partially restrict access by foot to the water, but surfers would be able to access the water from both north and south of the inlet construction area. The location of the landing of the shorepipe would be flagged for people to see and avoid. During installation and removal of the shorepipe, surfers and beachgoers would be restricted from its immediate location for a very short time (several hours). Access restrictions would result in **less than significant impacts to surfing and no substantial adverse effects have been identified.**	Surf sites within the materials placement footprints can expect to have increased backwash during high tide immediately during and after construction due to the increased steepness of the design berm. Changes in high tide, post-construction backwash are expected to be negligible at surf sites away from the fill sites. In addition, no long-term changes in backwash and other wave parameters (wave breaking intensity and wave vortex ratio) are expected (M&N 2014). Impacts to wave quality would be **less than significant and not substantially adverse.**
Leucadia	Volume of sand that could deposit at any one area is relatively low given small quantity of sand (approx. 115,000 cy) and length of site (approx. 0.5 mile). Long-term conditions at these sites would be maintained as the sand continues to disperse more broadly in the littoral cell.	See discussion under broad conclusion. **Less than significant and not substantially adverse**.	Not anticipated at this placement site. **Less than significant and not substantially adverse.**

Site	Modification of Sandbars or Reefs from Sand Deposition	Hindered Access during construction	Reduced Wave Quality from Wave Backwash?
	There would be **no long-term significant or substantial adverse effects** to surfing from beneficial reuse.		
Moonlight Beach	Volume of sand that could deposit at any one area is relatively low given small quantity of sand (approx. 105,000 cy) and length of site (approx. 0.15 mile). In the short term, the D Street surf site could benefit because it is a sand-bottom break and depends on sand bars for wave quality. Long-term conditions at these sites would be maintained as the sand continues to disperse more broadly in the littoral cell. There would be **no long-term significant or substantial adverse effects** to surfing from beneficial reuse.	See discussion under broad conclusion. **Less than significant and not substantially adverse.**	Not anticipated at this placement site. **Less than significant and not substantially adverse.**
Cardiff	Larger quantity of sand proposed for placement (500,000 cy in nearshore and 300,000 cy onshore) than at other sites. Multiyear monitoring of sand retention after the 2001 RBSP indicated that sand tended to reside longer in the sandy reach between Cardiff and Seaside reefs. This effect could be from the reefs acting as headlands, forming a long “pocket” beach in between. Thus, the project may result in more sand deposition near Cardiff; George’s should benefit from the longer-term sand deposition because it is a sand-bottom break and depends on sand bars for wave quality. The impact would be **less than significant and not substantially adverse**, with long-term conditions remaining at least as good as existing conditions at these sites over time.	See discussion under broad conclusion. **Less than significant and not substantially adverse.**	George’s can expect to have a constructed, high tide increase in backwash of approximately 11 percent during each placement construction episode (M&N 2014). Immediately after construction, the beach slope and backwash would start to become milder. By approximately 4 months after construction, the increase in backwash during high tide is expected to be approximately 3 percent. By 6 months after construction, project-induced signals in the profile slopes would be lost in the seasonal profile changes, which become greater than those generated by the project over time. These post-construction changes are expected to occur after each placement interval. This is **considered less than significant and not substantially adverse.**
Solana Beach	Volume of sand that could deposit at any one area is relatively low given small quantity of sand (approx. 145,000 cy) and length of site (approx. 0.89 mile). In the short term, reef breaks at Pill Box, Cherry Hill, and Rock Pile could break like sand-bottom surf spots. After the 2001	See discussion under broad conclusion. **Less than significant and not substantially adverse.**	Fletcher Cove can expect a similar one-time increase in backwash of approximately 12 percent during construction and 1 percent lasting for 4 months after placement (M&N 2014).

Site	Modification of Sandbars or Reefs from Sand Deposition	Hindered Access during construction	Reduced Wave Quality from Wave Backwash?
	RBSP, surfing at these sites improved for a short time and then reverted to pre-project conditions (Hopper 2012). The Del Mar River mouth may also benefit from the temporary sand deposition because it is a sand-bottom break and depends on sand bars for wave quality. Long-term conditions at these sites would be maintained as the sand continues to disperse more broadly in the littoral cell. There would **be no long-term significant or substantial adverse effects** to surfing from beneficial reuse.		This is **considered less than significant and not substantially adverse.**
Torrey Pines	Absolute volume of sand that could deposit at any one area is relatively low given small quantity of sand (approx. 245,000 cy) and length of site (approx. 0.30 mile). Nearby sites are sand bar breaks (although Black's is significantly-influenced by wave refraction over the Scripps Submarine Canyon) and those breaks may benefit. The Scripps canyon is south of the site and limited quantities from the project would reach sites south of that feature. There would be **no long-term significant or substantial adverse effects** to surfing from beneficial reuse.	See discussion under broad conclusion**. Less than significant and not substantially adverse.**	Not anticipated at this placement site. **Less than significant and not substantially adverse.**

Note: Applicable to Alternatives 2A and 1B only as Alternative 1A would not result in materials disposal/reuse at nearshore or onshore sites

Alternative 1B

Under Alternative 1B, impacts related to land use and recreation would be similar to those described for Alternative 2A. Specifically, materials disposal at this slightly lesser quantity (1.2 mcy) would not result in the permanent conversion of land, conflict with existing or future planned land uses, or be incompatible with adjacent land uses. From a recreation perspective, materials reuse would enhance the public's sandy beach opportunity with short-term inconvenience during the actual material placement activities. Depending on the beach site and material excavation rates, up to 500 feet of beach may be closed per day in a specific location. As sand placement activities shift along the beach, those areas in which sand placement has been completed would be reopened to public use. The same Project design features described for Alternative 2A would be implemented for Alternative 1B. Regarding impacts to surfing, Alternative 1B would result in nearly identical changes to those described above for Alternative 2A and in Table 3.1-4. The volume of material at Cardiff in the nearshore would be less (300,000 cy vs. 500,000 cy) because there would be no new inlet. The reuse materials placed in the nearshore at Cardiff under Alternative 1B could result in a temporary benefit to surfing as it is a sand-bottom break and depends on sand bars for wave quality, but no long-term effects would be anticipated due to complete sand dispersion over time (M&N 2014). As such, a temporary surfing benefit would occur compared to existing conditions. There would be **no significant impacts (Criteria D and E) or substantial adverse impacts to recreation resources as a result of material placement.**

Alternative 1A

Under Alternative 1A, dredged materials would be of poor quality (i.e., fine grain size) not suitable for reuse and would therefore be disposed of in LA-5 as detailed in the SAP (M&N 2013). While Alternative 1A would not institute beneficial beach-placement reuse, it would not be inconsistent with adopted goals and policies for regional sand replenishment since they are linked to "beach-quality" material. Disposal of materials under Alternative 1A would result in **less than significant land use impacts (Criteria A, B, and C) and no substantial adverse impacts have been identified.**

Transport of materials to LA-5 would occur via a monobuoy and barge system, as described in Section 2.10.2. While some restrictions would be in place during disposal operations (i.e., boaters and recreationists would be restricted from areas directly in the vicinity of pipelines and transport equipment), this would be a short-term temporary impact occurring periodically over 9 months. This activity would not preclude recreational fishing in other areas, as restrictions would be localized around the pipeline and monobuoy. For impacts related to commercial fishing, refer to Section 3.13 Socioeconomics. The same ocean safety project design features described for Alternative 2A would be implemented for ocean transport activities associated with Alternative 1A. Alternative 1A would have no effects on surfing since no materials would be placed in the littoral zone and there would be limited increase in tidal flow from the inlet. Materials disposal activities would not preclude the viability of recreational activities or result in a permanent and major loss of recreational uses. Therefore, Alternative 1A would result in **less than significant recreational impacts (Criteria D and E) and no substantial adverse impacts have been identified**.

No Project/No Federal Action Alternative

No new materials placement activities would occur under the No Project/No Federal Action Alternative. The existing inlet would continue to be opened annually, with excavated material deposited on the beach near the mouth. With no restoration or dredging proposed, this alternative would not generate the opportunity to fulfill the beach nourishment goals and policies of the various general plans and LCPs, nor would additional recreational beach area be created beyond what material is currently placed on the beach near the mouth of the existing inlet. **There would be no land use or recreation impacts (Criteria A, B, C, D, and E) or substantial adverse effects under this alternative.**

3.1.4 Avoidance, Minimization, and Mitigation Measures

The SELRP would not result in significant or substantially adverse land use or recreation impacts; therefore, no mitigation measures are required. Project design features listed in Table 2-26 would help to minimize and avoid potential land use or recreation conflicts. Project design features applicable to land use include the maintenance of north-south access along Coast Highway 101 and neighboring commercial establishments during construction and implementation of a public information program. Recreation-related project design features include temporary restriction of public access, trails, and beach and nearshore ocean areas to maintain public safety, with some trail access and beach/ocean access remaining available throughout construction to maintain public access to the Reserve and beach areas. Project design features also require returning trails and access to pre-project conditions, scheduling material placement the extent possible to avoid major holidays and special events, and surf monitoring. These recreation-related project design features would help to ensure that the current recreational land uses are maintained to the fullest extent possible during construction and that the recreating public remains safe from construction hazards.

3.1.5 Level of Impact after Mitigation

CEQA: Implementation of Alternative 2A, Alternative 1B, Alternative 1A, and the No Project/No Federal Action Alternative would result in less than significant impacts related to land use and recreation for both lagoon restoration and materials placement project components.

NEPA: Implementation of Alternative 2A, Alternative 1B, Alternative 1A, and the No Project/No Federal Action Alternative would not result in substantial adverse impacts related to land use and recreation for either lagoon restoration or materials placement.

3.2 HYDROLOGY

This section is based primarily on site visits and technical data from engineering studies prepared by Moffatt & Nichol Engineers (M&N); specifically the Amended Hydrology/Hydraulic Study (M&N 2012a; Appendix D) and the Ebb Bar and Flood Shoal Study (2011). From these technical studies, hydrology characteristics within San Elijo Lagoon are discussed relative to the following:

- Water balance and circulation
- Surface hydrology/drainage
- Groundwater hydrology
- Flooding, erosion, and siltation
- Flood control

3.2.1 AFFECTED ENVIRONMENT

The discussion of the affected environment below focuses on the hydrologic features and patterns of the lagoon and associated inland surface waters. The dynamics of the adjacent coastline (i.e., the offshore ebb bar at the lagoon mouth) are discussed in Section 3.3 Oceanography/Coastal Processes, which further describes the effects of storms and waves on the proposed project. Section 3.3 also addresses coastal inlet protection, ocean wave energy effects, and ebb bar formations affecting the lagoon. Off-site materials placement/disposal is proposed for area beaches/nearshore and offshore sites, which are also primarily affected by coastal processes rather than the internal hydrology of the lagoon. Therefore, this section does not address hydrology impacts associated with placement of materials on beaches, in the nearshore, or in the offshore.Also refer to Section 3.4 Water and Aquatic Sediment Quality for a description of the lagoon’s water quality characteristics and the potential changes anticipated from the various project alternatives.

San Elijo Lagoon is a coastal wetland that occupies approximately 465 acres, dominated by mudflats. The lagoon is traversed by Coast Highway 101, the NCTD Railroad, I-5, and the CDFW dike, which constrict the hydrology of the lagoon and reduce its hydraulic efficiency. Stormwater and urban runoff enters the lagoon through Escondido Creek, Orilla Creek, and adjacent neighborhoods. The watershed upstream from the lagoon has been urbanized over the last several decades, and as urbanization has increased, urban runoff into the lagoon through these creeks has also increased. Historic sedimentation into the lagoon was relatively high due to an undeveloped watershed. Because much of the lagoon’s watershed is now highly urbanized, sediment inflow to the lagoon has been low for many years. Therefore, resident sediment within the lagoon primarily represents historical deposition that occurred prior to and during early development in the area (USDA 1993).

Historic evidence suggests that San Elijo Lagoon was once a perennially open system (within the last 200 years), prior to substantial man-made modifications. However, under the more developed conditions that characterize the lagoon currently, the negative effects of inlet closure have been documented. Prior to active management of the lagoon inlet, the mouth of the lagoon was closed much of the year due to the accumulation of coarse beach sands brought into the inlet from incoming (flood) tidal flows. These beach sand deposits create a flood shoal inside the inlet that reduces the ability of the lagoon to flush during tidal cycles. Because of these cyclical (yet persistent) depositions, outgoing (ebb) tide velocities are also dampened to the point where they are insufficient to scour or transport deposits back to the coast. As a result, tidal exchange with the lagoon and circulation within the lagoon have been constricted and inefficient for decades at the mouth as well as within the tributary channels in each of the three basins. This reduced tidal exchange (i.e., insufficient tidal prism) has contributed to the historical accumulation of fine sediments in the east and central basins of the lagoon (USDA 1993). Since the 1990s, the SELC has manually opened the inlet at least annually and maintained an open mouth for much of the time. Sediment accumulation inside portions of the lagoon, particularly the west and central basins, has decreased with the open mouth conditions and the urbanization of the upstream watershed, but historic accumulated sediments remain within the lagoon.

Even under open tidal mouth conditions, muted tidal flow throughout the lagoon occurs due to the inlet configuration and channel inefficiencies, particularly in the east basin where flushing is most limited. Manual opening of the tidal inlet conducted by SELC maintains a degree of tidal flushing, but the underlying causes of flood shoal accumulation and inlet closure continue and result in repeated closures.

Water Balance and Circulation

The hydrology within San Elijo Lagoon is largely driven by freshwater supplied from the upstream watersheds and from along the coast via ocean tidal fluctuations. However, the hydrologic water balance and the circulation dynamics of the lagoon are dependent on the surrounding landform topography and the lagoon bathymetry that vary seasonally relative to the following:

- Precipitation (watershed drainage and direct rainfall to the lagoon);
- Tidal prism (seawater/brackish water volume circulating into, within, and out of the lagoon);

- Groundwater level and groundwater/surface flow relationships (e.g., groundwater springs and seepage);
- Urban dry weather runoff;
- Evaporative water loss due to combinations of temperature, humidity, and wind; and
- Aquatic and wetland plant transpiration water loss.

San Elijo Lagoon receives approximately 1 million gallons per day (mgd) of watershed runoff (storm water and urban flows) year-round from Escondido Creek (Gibson 2012). Prior to urbanization, Escondido Creek was an intermittent creek, but it currently behaves as a perennial creek (CWN 2002) due to dry weather urban runoff contributions, causing the water balance to become increasingly dominated by freshwater.

Several human modifications in addition to increased runoff flows affect the water balance and circulation within the lagoon, including Coast Highway 101, the NCTD railroad, the CDFW dike, and I-5. These developments have increased water impounding within the lagoon, thereby increasing water elevations and the resistance to tidal forces. Additionally, the inlet of San Elijo Lagoon is often constricted due to coastal processes (beach sand migration and flood shoal development), which requires manual reopening of the mouth each year to improve tidal flushing and lagoon water quality. A flood shoal modeling study (M&N 2011) was conducted for the SELRP to evaluate the tidal hydrodynamics and ocean waves/currents that manipulate sand bar formation off the lagoon mouth in the ocean (ebb bar) and within the lagoon (flood shoal). Ebb bars can change incoming ocean wave patterns and consequent changes to the shoreline, while flood shoals can mute or dampen the tides in the lagoon and affect hydrology and water quality.

Shoaling at the inlet, coupled with inefficient drainage patterns of the lagoon, suppresses tidal influence on the lagoon, resulting in a muted tide range (M&N 2012a). A muted tide range results from the hydraulic inefficiencies at the inlet in the lagoon, and water fluctuations within the lagoon do not vary as much as the adjacent ocean during a typical tide cycle. In addition to decreased circulation and associated water quality issues, muted tide ranges lead to artificially narrow intertidal habitat bands and can lead to decreased habitat diversity. Tidal influence decreases with distance inland, reducing circulation from the west basin to the east basin.

The hydraulic inefficiencies within San Elijo Lagoon have led to a consistent degradation of water quality in the lagoon and a change in habitat conditions, described in more detail below under surface hydrology. Active maintenance of the lagoon mouth has improved habitat and water quality by improving tidal exchange and circulation; however, muted tidal exchange and poor circulation continue, which affects habitat distribution and quality and reduces inlet stability. In general, maintaining regular and unmuted tidal exchange improves water circulation throughout water bodies and overall water quality by preventing extreme fluctuations in temperature and salinity. Drainage of freshwater fluvial flows from the upstream watershed also continues to be inefficient due to constrictions at the CDFW dike and I-5. Effects on water quality and biological resources are discussed in more detail in Sections 3.4 Water and Aquatic Sediment Quality and 3.6 Biological Resources, respectively.

Surface Hydrology

San Elijo Lagoon is located within the Escondido Creek Hydrologic Area (HA) of the Carlsbad Hydrologic Unit (HU). Figure 3.2-1 shows the study area within the hydrology of the region. The Carlsbad HU encompasses approximately 210 square miles and extends from the headwaters above Lake Wohlford in the east, to the Pacific Ocean to the west, and from the cities of Vista and Oceanside in the north, to Solana Beach and Escondido in the south. There are numerous important surface hydrologic features within the Carlsbad HU, including four ecologically sensitive coastal lagoons, four creeks, and two large water storage reservoirs (Lake Wohlford and Dixon Lake).

The Carlsbad HU is composed of six HAs: Loma Alta, Buena Vista Creek, Agua Hedionda, Encinas, San Marcos, and Escondido Creek. Most of the Carlsbad HU is urbanized (48 percent), with residential (29 percent), commercial/industrial (6 percent), freeways and roads (12 percent), agriculture (12 percent), and vacant/undeveloped (32 percent) composing the dominant land uses.

The Escondido Creek HA comprises the largest portion (40 percent) of the Carlsbad HU (CWN 2002). Escondido Creek begins in the headwaters of Lake Wohlford in Bear Valley and ends in San Elijo Lagoon. Elevations within the watershed range from sea level to 2,420 feet on the ridges above Bear Valley. Through the City of Escondido, the creek has been channelized but otherwise remains fairly undeveloped. The land uses of the Escondido Creek HA are also dominated by urban areas (44 percent) with rural residential (15 percent), agriculture (10 percent), and open space (31 percent) occupying the rest (McLaughlin 2010).

The lagoon receives runoff from Escondido Creek, its tributaries, and the smaller La Orilla Creek prior to discharge into the Pacific Ocean. Smaller drainage areas on adjacent land also contribute runoff into the lagoon. Average annual precipitation ranges from 11 to 15 inches.

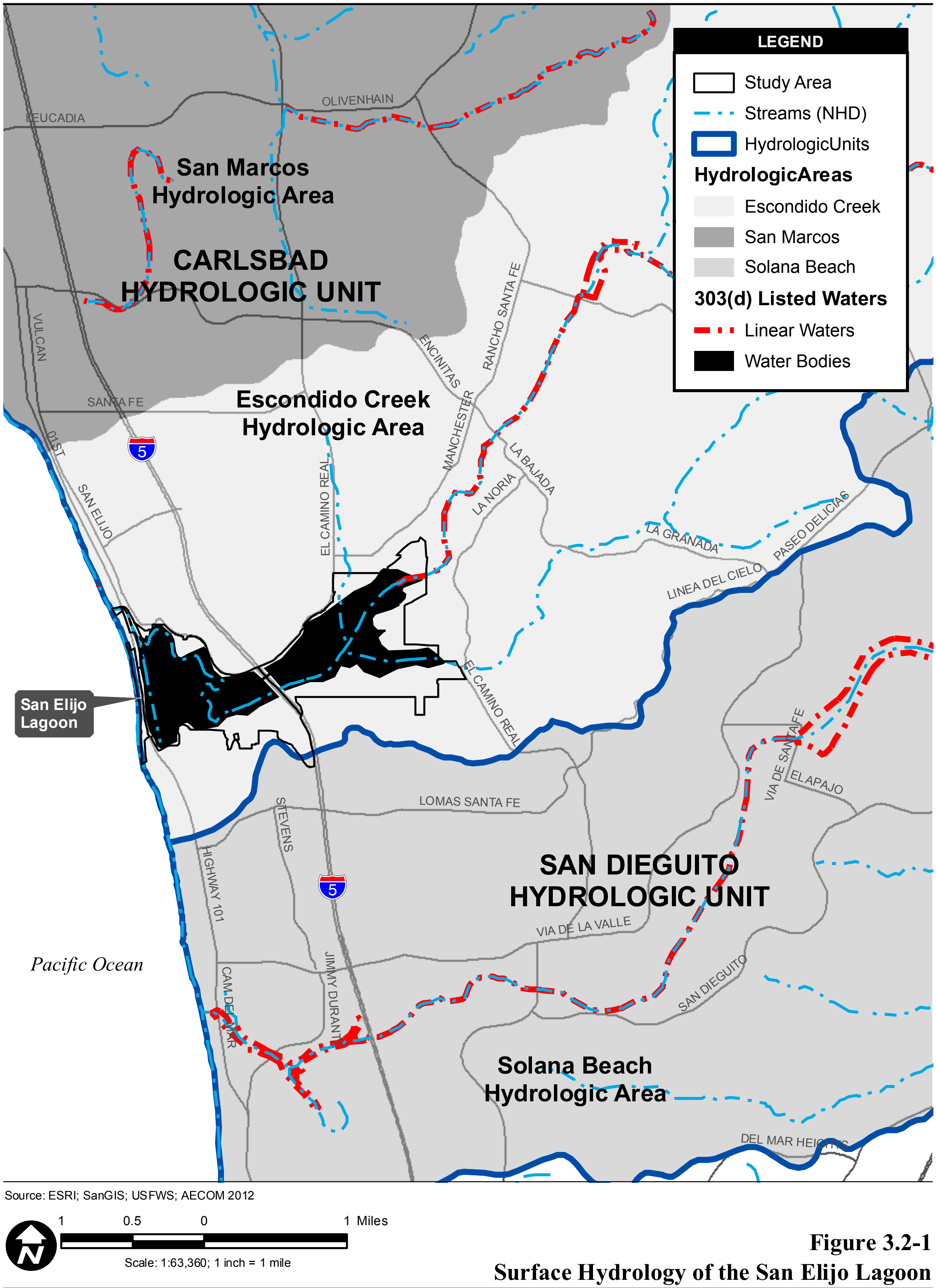


Figure 3.2-1
Surface Hydrology of the San Elijo Lagoon

Path: P:\2009\09080064_SELRP_EIR\6.0 GIS\6.3 Layout\EIR_EIS\SurfaceHydrology.mxd, 2/12/2014, steinb

Groundwater Hydrology

San Elijo Lagoon is underlain by the San Elijo Valley Groundwater Basin. The San Elijo Valley Groundwater Basin underlies two southwest-northeast-trending valleys with Escondido Creek flowing through the upper, northeast valley, and discharging into San Elijo Lagoon. The basin is bounded to the north and south by alluvium with the semipermeable marine deposits of the La Jolla Group. The northeastern boundary is defined by contact with impermeable Cretaceous deposits of the Santiago Peak Volcanics (DWR 2004). The western boundary is the Pacific Ocean.

Natural recharge of the alluvial aquifer is primarily from percolation in Escondido Creek, with smaller amounts contributed by direct precipitation and underflow from the surrounding marine sedimentary units. Infiltration from agricultural and residential uses contributes additional groundwater recharge. Groundwater in this basin is unconfined and characterized by exchange with both the overlying lagoon and adjacent ocean waters (DWR 2004).

Seawater affects lagoon circulation by tidal inundation on the surface and upwelling through the groundwater (Corps 2002).

In late 2012, USGS and the Olivenhain Municipal Water District (OMWD) installed a research and monitoring well to assess groundwater underlying San Elijo Lagoon for potential potable use. Testing revealed that the groundwater aquifer may be of sufficient quality and quantity to be used as a source of potable water and/or for groundwater recharge (OMWD 2014). The testing results also indicate that this aquifer is at depths substantially lower than the alluvial aquifer directly underlying the lagoon, and that measurable exchange between the lagoon and groundwater is limited to the alluvial aquifer.

Flooding, Erosion, and Siltation

During large storm events, flood flows from the watershed entering the lagoon can force the inlet open by hydraulic force and/or by overtopping with erosive outflow. However, such natural openings happen infrequently, and throughout most of the year (and often during low-rainfall winter seasons), the mouth of the lagoon would remain closed due to poor tidal flushing (i.e., the hydraulically inefficient channel system and the flood shoal formation that results). The sinuous channel extending east from the inlet currently cannot sustain sufficient water velocities to consistently keep the lagoon mouth open to ocean tidal flushing such that it could counteract the constant longshore transport of beach sand. To minimize water quality, circulation, flooding, and habitat issues exacerbated by closed inlet conditions, particularly during warm weather and the nesting season, the lagoon inlet is mechanically opened to maintain hydraulic connectivity between the ocean and the lagoon when natural wet-season flows are otherwise ineffective.

With the maintained open inlet, the general water level has been reduced in the lagoon, but the potential for flooding within adjacent areas remains a concern. Formal mapping of the 100-year floodplain is described below, but flooding currently occurs in some areas under much smaller storm events due to the hydraulic constrictions within the lagoon. While the I-5 and NCTD railroad bridges are proposed for improvements by others (Caltrans and SANDAG, respectively) to enhance hydraulic connectivity and decrease the potential for flooding, the CDFW dike and inlet also contribute to existing flooding concerns along Manchester Avenue in particular. Structures within the lagoon are protected against erosion, and flood flows traveling through the lagoon are typically slowed by the infrastructure as they flow through the lagoon toward the ocean. As a result, erosion along adjacent roadways and trails is relatively low.

Another location in which flooding is a concern is along Coast Highway 101 south of the existing lagoon inlet. Wave runup during storm events currently leads to occasional flooding of the roadway, and riprap that protects the roadbed is at risk of being undermined (personal communication Kathy Weldon, 2014). Sand placement as part of the 2012 RBSP provided some additional protection to the roadway, but as the sand is distributed through the littoral system and the beach narrows, flooding along Coast Highway 101 is expected to continue.

Historically, activities occurring throughout the watershed, such as road development, agriculture, and construction, resulted in erosion and consequent sediment transport that settled out in the lagoon. Escondido Creek and, to a lesser extent, La Orilla Creek, are the historic principal transporters of alluvial sediment. Much of the lagoon sedimentation occurred during earlier decades of heightened construction and agricultural activity, and lagoon sedimentation rates have decreased over time due to urbanized buildout, reduced agriculture, and the initiation of conservation practices (County of San Diego 1996). Sedimentation within San Elijo Lagoon continues, albeit at a reduced level, from upland erosion sources and from littoral transport along the beach area that is brought into the lagoon mouth during tidal cycles.

As mentioned earlier, the effects of the channel constrictions at the CDFW dike, Coast Highway 101, and bridges on I-5 and the NCTD railroad continue to cause flow reductions that induce sediment fallout and entrapment in the lagoon. Within the lagoon itself, circuitous channel configurations also reduce flow rates and promote the settling of sediment in the lagoon from both upland and coastal sources. As a result of decades of poor circulation, consistent sediment loading (particularly prior to urbanization of the watershed), and insufficient inlet maintenance, the east and central basins of the lagoon have built up significant deposits of primarily fine sediments. In general, the lagoon consists of a thin layer of fine-grained material (~29 percent fines) that overlays a thick, relatively homogenous layer of sandy materials (~10 percent fines). The upper layer of material represents a small fraction (approximately 9 percent) (M&N 2013).

According to the Ebb Bar and Flood Shoal Study (M&N 2011), dredge records and modeling indicate that San Elijo Lagoon has a flood shoal volume of 63,300 cy at equilibrium. To maintain the inlet open to tidal flushing, the SELC manually opens the inlet at least annually and removes approximately 30,000 cy of sediment. Refer to Section 3.3 Oceanography/Coastal Processes for additional details on coastal processes and morphology, including information on ebb bar formation in the nearshore area off the inlet. The flood shoal is composed of material entrained in the inlet and is primarily sand. As sand, it has a relatively large grain size and settles out relatively quickly when compared to upland sediment sources that can be much finer-grained silts and clays. Therefore, the flood shoal remains near the inlet location and does not generally result in sedimentation in adjacent habitat areas, making removal through inlet maintenance an effective means of sediment control. When this material is removed as part of inlet maintenance, it is placed on the south side of the inlet in a process known as bypassing. This occurs at a number of lagoons and coastal inlets along the San Diego coastline, and enables sand travelling alongshore in a littoral current to continue to provide material for the littoral sand cycle.

Flood Control

The need for controlling floodwaters is based on geographic flood zone areas that FEMA defines according to varying levels of flood risk. These zones are depicted on FIRM or Flood Hazard Boundary Maps. Each zone reflects the severity or type of flooding in the area. A large percentage of the lagoon and adjacent areas, particularly to the north of the lagoon, are located within the FEMA 100-year or 500-year flood zone. San Elijo Lagoon is a part of the Escondido Creek floodplain. Although located farther upstream in the watershed, Lake Wohlford and Dixon Lake offer some flood control for Escondido Creek and San Elijo Lagoon.

Within the lagoon footprint, the CDFW dike, Coast Highway 101, NCTD railroad, and I-5 have contributed to restricting the movement and release of flood flows through the lagoon to the Pacific Ocean. As these structures were constructed, no formal flood control measures were implemented within the lagoon to compensate for the exacerbation of flood conditions. Low-lying areas along the floodplains of Escondido Creek and its tributaries can experience flooding during severe rain events that are smaller than the 100-year event as well. The current 100-year flood elevations around the east basin and along Manchester Avenue exceed the road elevation by 2 to 4 feet, depending on location and analysis approach, and are often flooded during moderate storms.

3.2.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to hydrology would occur if implementation of the SELRP results in substantial negative temporary (construction-related) or permanent (post-construction) effects on:

A. Lagoon circulation, surface drainage patterns or amount of surface runoff;

B. Groundwater quality and/or recharge;

C. The potential for flooding, erosion, or siltation; or

D. The potential for exposure of people or property to water-related hazards such as flooding

The CEQA thresholds of significance for hydrology were derived from a combination of thresholds listed in Appendix G of the CEQA Guidelines and thresholds used in the EIR/EIS for the Bolsa Chica Lowlands Restoration Project (SCH #2000071068) and the 2012 RBSP EA/EIR (SCH #2020051063). These coastal restoration projects provide additional guidance beyond thresholds suggested by the County, as related to the unique hydrological concerns of coastal restoration and sand placement projects.

3.2.3 ENVIRONMENTAL CONSEQUENCES

The environmental consequences, or impacts, associated with the proposed project on lagoon and inland surface hydrologic patterns are discussed below. Table 3.2-1 presents predicted tidal ranges at several locations within the lagoon for each alternative, and the ocean tidal range for comparison. Each location represents conditions within the lagoon moving eastward from the ocean.

Table 3.2-1
Predicted Tidal Ranges for Restoration Alternatives

	Tidal Range (feet)					
Alternative	**Ocean**	**Highway 101**	**West Basin**	**Central Basin**	**I-5**	**East Basin**
Existing	7.97	4.56	3.99	3.85	3.78	3.76
1A	7.97	7.11	5.56	5.26	5.21	5.15
1B	7.97	6.58	5.44	5.42	5.42	5.43
2A	7.97	7.97	7.93	7.92	7.87	7.88

Source: M&N 2012a

Table 3.2-2 illustrates the maximum 100-year flood elevation within the lagoon at various locations for each alternative.

Table 3.2-2
Maximum 100-Year Flood Elevation in the Wetlands (feet, NGVD)
Based on +5.4-Foot NGVD (Recorded Highest) Downstream Tidal Elevation

Virtual Gage Locations	Manchester Avenue Elevation	Existing	Alt 1A	Alt 1B	Alt 2A
Highway 101	N/A	5.3	5.3	5.3	5.3
Railroad	N/A	8.5	7.9	8.1	6.3
Central Basin 1	29.0	8.9	8.4	8.7	6.5
Central Basin 2	9.8	9.0	8.5	8.7	6.7
I-5	12.7	9.4	8.9	8.8	7.3
East Basin 1	12.9	9.8	9.8	8.8	7.5
East Basin 2	9.3	**12.3**	**11.7**	9.0	8.1
East Basin 3	10.3	**12.4**	**11.7**	9.0	8.3
East Basin 4	10.4	**12.3**	**11.8**	9.0	8.4

Source: M&N 2012a

Note: Values in **bold** indicate elevations above the roadway and represent potential flooding.

For each alternative, potential substantial adverse, significant, or beneficial temporary and permanent, direct and indirect impacts are identified below.

Alternative 2A

Temporary

Temporary impacts to hydrology could occur during construction activities, including diking and inundating areas for dredging, grading along the perimeter and access roads, equipment staging, and on-site materials disposal and placement. Construction would be phased as described in Chapter 2, and dry disturbed areas would be generally limited to staging areas, access road improvements, and areas disturbed during bridge construction. Wet disturbed areas would include portions of the lagoon basins dredged to lower elevations or built up as transitional areas. During the construction process, there would be temporary but dynamic changes to the lagoon's water balance (inflow/outflow; depth), circulation, and surface hydrology. As channels, dikes, and the new mouth are formed, water levels wouldadjust relative to the available cross-sectional area of newly sculpted areas, temporarily reducing water levels in some areas and altering flow regimes as areas are deepened. During periods of inundation within certain areas of the lagoon, water levels within diked off areas would increase relative to existing conditions, altering flow regimes. Inundation would last from 3 to 7 months and amounts would range from +5 to +6 feet

NGVD depending on basin location and phase of construction (see Table 2-22 for length and amounts of inundation that would occur in each basin during phased construction). Inundated areas could be subject to slower velocities as they are separated from main channel and inlet flows, so increased erosion and/or siltation would not be anticipated. In addition, as noted above, sediment entering the lagoon has decreased as the upstream watershed has been developed, so siltation due to incoming runoff would not increase substantially. Some circulation would continue to occur due to dredge and support equipment movement and wind wave-driven circulation. Figure 2-16 shows those areas that, once dredged, would be exposed as open water channels, tidal mudflats, or salt marsh once re-established by marsh vegetation. Dredged areas would be opened to tidal action, and would begin to revegetate immediately through natural plant recruitment reducing the potential for erosion. Additional planting of specific habitat would also occur to facilitate recovery. Periodic maintenance activities would cause temporary dredging of the channels. Since tidal flows in areas subject to erosion/siltation (eastern portions of the project) would remain relatively slow through newly dredged areas, and since areas identified as sensitive to erosion (channel slopes under infrastructure) would be structurally protected as described in Chapter 2, erosion or siltation during construction and maintenance activities would be minimal. See Section 3.4 Water and Aquatic Sediment Quality for a discussion of water quality impacts related to sedimentation/siltation and turbidity.

Compliance with applicable regulations (i.e., Construction General Permit, Municipal Permit) would be required to ensure impacts during construction activities are minimized. Erosion and sediment control would be addressed in the project-specific Storm Water Pollution Prevention Plan (SWPPP) (PDF-25) required under the Construction General Permit to minimize scour, erosion, and impacts on surface drainage patterns and runoff volumes. The SWPPP would be developed and implemented by the contractor in compliance with existing regulations and would include erosion-control BMPs such as riprap, hydraulic mulch, soil binders, and hydroseed. The SWPPP and SWMP, HMP, and LID plans would conform with a variety of federal, state, and local regulatory requirements (e.g., Section 111.5 and Appendix F of the Construction General Permit [Order 2010-0014-DWQ]) and require implementation of construction BMPs to stabilize soils during land-based construction and staging/access to minimize erosion/siltation. Section 3.4 (Water and Aquatic Sediment Quality) identifies specific BMPs that could be implemented as part of the SWPPP and SWMP, HMP, and LID plans.

Dikes would incorporate a mechanism to control water elevations and allow the release of water if runoff into the diked areas raises water levels above 5 or 6 feet NGVD in the east or central and west basins, respectively. Proposed elevations would remain below the 100-year storm water elevation (Table 3.2-2; M&N 2012a). Flooding of adjacent infrastructure and/or roadways would not occur and the potential for exposure of people or property to hazards such as flooding would not be increased over existing conditions. Water level would return to pre-construction elevations (i.e., approximate mean sea level) once each area is reopened to tidal flow (Table 3.2-1; M&N 2012a). Upon the completion of construction, circulation and surface drainage patterns within the lagoon would be improved. **Temporary impacts would not be substantially adverse and impacts would be less than significant to lagoon circulation and drainage patterns, flooding, erosion or siltation, or increased exposure to water-related hazards (Criteria A, C, and D).**

The lagoon is underlain by an unconfined alluvial groundwater basin that is characterized by exchange with both the overlying lagoon and adjacent ocean waters. Water levels in diked areas of the lagoon would temporarily increase during periods of inundation. Hydrologic connectivity between groundwater and the lagoon would not be expected to change as a result of temporary work activities. No substantial reduction in recharge characteristics would occur during construction. **Impacts from construction activities would be less than significant for altering existing conditions related to the exchange of lagoon and groundwater that could result in substantial impacts to recharge characteristics (Criterion B). No substantial adverse impacts would occur.**

<u>Permanent</u>

Alternative 2A would increase the hydraulic efficiency of San Elijo Lagoon by creating a new, larger, more stable inlet (proposed new inlet channel would increase by nearly 100 feet), increasing and extending the channel network within the lagoon basins (see Table 2-7 for new channel dimensions at infrastructure crossings under Alternative 2A), and improving infrastructure to minimize constrictions at crossings. Drainage patterns and circulation within the lagoon would be altered from existing conditions with increased tidal exchange and improved channel, but would benefit the lagoon overall with respect to biological resources and water quality, in particular. With expanded channels and the new mouth, water levels would vary relative to the expanded cross-sectional area of newly sculpted channels, altering flow regimes in deepened areas. Circulation within the lagoon would increase with the new inlet and improved channel network. Flow volumes and velocities through the lagoon would be expected to increase due to the open tidal inlet. Hydrology throughout the lagoon would be greatly improved through the creation of a new and enlarged inlet mouth and enhanced channel flow regimes that would allow freshwater to flow out of the lagoon and promote improved tidal exchange deeper to the inland areas of the lagoon.

Removal of the CDFW dike and improvements at I-5 (proposed by Caltrans), the railroad (proposed by SANDAG), and Coast Highway 101, as well as straightening and enlarging the main channel, would enable the lagoon to drain incoming freshwater more efficiently reducing flood elevations (Table 3.2-2). The duration of flood drainage (from the upstream lagoon boundary to Highway 101) would be shortened to approximately 14 percent of the duration under existing conditions (M&N 2012b). Drainage would be more efficient both during dry weather flows that currently support freshwater habitat (e.g., cattails) east of I-5, as well as during storm events, leading to less potential in general for flooding hazards, which are discussed in more detail below. These same improvements to the channel network would increase tidal influence in the east basin of the lagoon.

Tidal influence would also be increased over existing conditions throughout the lagoon by constructing a new, larger, and more stable inlet south of the existing inlet (Table 3.2-1). The new inlet would provide less muted flow directly into lagoon channels. The larger cross-sectional profile area of the dredged channels would offer less resistance to tidal fluctuation and allow a greater volume of tidal exchange, giving the lagoon a greater opportunity to flush more readily than existing conditions. This inlet would provide additional circulation to the east basin, as well as throughout the central and west basins through the extension of the existing channel network. This additional circulation would promote lower residence times and higher water quality conditions throughout the lagoon compared to existing conditions (discussed in 3.4 Water and Aquatic Sediment Quality).

As shown in Table 3.2-1, Alternative 2A would result in a substantially larger tidal range than currently exists in the lagoon, providing a range very close to the open ocean, essentially eliminating the muting effects of the current lagoon inlet (e.g., since the tide range would be very close to open ocean tidal range).

The anticipated increase in tidal range under Alternative 2A would shift the inlet from a flood-dominated system to an ebb-dominated system, leading to a more stable inlet condition. As discussed in 3.3 Coastal Processes, this new ebb bar is predicted to have a volume of approximately 345,000 cy at equilibrium. This is a substantial increase from the existing ebb bar of 3,600 cy at the current inlet. The ebb bar would be larger than the volume of the flood bar (266,000 cy) and the new inlet would result in a more tidally stable ebb-dominated system. This shift to an ebb-dominated system would reduce the entrainment of sand moving along the coast into the inlet, and slow the development of a flood shoal, leading to an inlet that remains open for longer periods of time and maintaining a less muted tide range for longer periods of time. Therefore, although Alternative 2A would involve the largest amount of initial dredging and a greater amount of initial sediment removal, it would require maintenance dredging every 3 to 4 years compared to the annual maintenance currently required. By changing the lagoon to an ebb flow-dominated hydrologic system, the necessity for repeated inlet and/or channel maintenance would be less frequent than the current inlet condition, although volumes removed during each maintenance event are anticipated to be greater.

Alternative 2A would result in a net increase in impervious area of 0.53 acre. Though some concrete would be removed from the CDFW dike in the east basin of the lagoon, a new bridge would be constructed over the new inlet along the existing Coast Highway 101 road segment already traversing the lagoon, and a permanent launch ramp would be built for a dredge in the central basin. The launch ramp is expected to have a small footprint. The 0.53-acre increase is relatively small (0.05 percent increase in impervious area of the total project area). The bridge would require proper drainage designs per applicable regulations (i.e., Standard Urban Storm Water Mitigation Plan [SUSMP], Hydromodification Management Plan [HMP], low impact development [LID] BMPs) to minimize any increase in discharge flow rate, runoff volume, or erosion potential. By complying with the regulatory requirements and properly implementing appropriate BMPs, no significant changes to surface runoff patterns or sedimentation (siltation) loads into the lagoon would occur.

Hydrologic improvements associated with Alternative 2A would improve existing constrictions (e.g., along Highway 101 and I-5) within the lagoon that have contributed to restricting water flow and circulation. This alternative would also improve the ability of the lagoon to drain freshwater currently impounded in the east basin and improve tidal influence throughout the basins. A more stable tidal inlet would also result in longer periods of unmuted tidal exchange between the ocean and lagoon. Alternative 2A, though changing the existing drainage patterns, would restore drainage patterns closer to the lagoons predevelopment state and would result in a beneficial impact on circulation and surface drainage patterns. **The project's impact on surface runoff and drainage patterns would be less than significant. No substantial adverse or significant impacts would occur (Criterion A).**

Alternative 2A would enlarge the tidal channel network throughout the lagoon and enhance the ability of the lagoon to drain incoming freshwater flows currently impounded in the east basin, as described above. Water would continue to be present in all of the basins and would not substantially change. The lagoon is currently underlain by an unconfined alluvial groundwater basin that is characterized by exchange with both the overlying lagoon and adjacent ocean waters. Measurable exchange between the lagoon and groundwater is likely limited to the alluvial aquifer (discussed above under Groundwater Hydrology), and increased tidal circulation within the lagoon would not represent a substantial change to conditions that influence **recharge characteristics; impacts would be less than significant (Criterion B) and would not be substantially adverse.**

Alternative 2A would enhance the ability of the lagoon to drain fluvial flows to the ocean through improvements to the main channel and infrastructure constriction points, as discussed above. Improved drainage would generally reduce the potential for flooding to occur within the lagoon and along adjacent infrastructure during dry weather flows and small storm events. Flow volumes through the lagoon may increase, creating the potential for erosion in specific locations. As discussed in Chapter 2, infrastructure protection has been incorporated into the project design and these areas would not be susceptible to erosion under higher flow velocities.

Siltation within the lagoon could occur from inputs from upstream fluvial flows, erosion within the lagoon, or sediment entering from the coast. Sediment entering the lagoon has decreased as the upstream watershed has been developed, so siltation due to incoming runoff would not increase substantially under any of the build alternatives. Erosion along the lagoon channels would not be substantial due to protection designed for areas predicted to be susceptible to scour. Directly after construction, there may be exposed soils that could be susceptible to erosion within the lagoon. These areas are anticipated to become vegetated as soils stabilize and natural recruitment or restoration planting occurs, and erosion would be short term and not substantial. The potential for erosion would also be expected to decrease with increased habitat value and soil stability (primarily vegetation) and improved erosion control.

Entrainment of sand from the littoral zone entering the lagoon inlet is discussed above in the context of the flood shoal that would develop between maintenance cycles. Alternative 2A would shift the lagoon from a flood-dominated system to an ebb-dominated system and would result in a relatively slow accumulation of the flood shoal. Sand would continue to enter the lagoon; however, sand is relatively large in grain size and typically settles out of the water column relatively quickly. The creation of a sedimentation basin inside of the inlet and the grain size characteristics of entering sand would limit siltation to within the inlet area, minimizing impacts to surrounding habitat areas. Shoals would be monitored by SELC on a semi-annual basis and removed during regular maintenance or as-needed (PDF-40). **Therefore, impacts to flooding, erosion, and/or siltation would be less than significant (Criterion C). No substantial adverse impacts would occur.**

Existing flood elevations during the 100-year storm event are currently mapped as extending over adjacent Manchester Avenue in the east basin, as identified in Table 3.2-2. Alternative 2A would reduce flood elevations compared to existing conditions with improved lagoon hydrology proposed under this alternative. Proposed elevations would remain below the 100-year storm water elevation (Table 3.2-2). Flood elevations would be reduced to levels below Manchester Avenue along its length due to expanded channel cross-sections under each of the lagoon bridges and improvements to the lagoon channel network and proposed new inlet. Flooding of adjacent infrastructure and/or roadways would not occur and the potential for exposure of people and property to flooding and other such water-related hazards would be decreased over existing conditions. Channel and infrastructure improvements would be reviewed by the County, Caltrans, the City of Solana Beach, and the City of Encinitas, as appropriate, prior to approval of project grading plans (PDF-50).

Once construction is completed, a LOMR would be filed to formally modify the FIRM, or Flood Boundary and Floodway Map (FBFM), or both (PDF-49). This alternative would not require a CLOMR, which is needed if a proposed project causes an increase in flood elevation of greater than 1.00 foot and is within a flood area designated as Zone A. Given the nature of the design under Alternative 2A, the LOMR would recognize the net reduction in Base Flood Elevation (BFE) achieved as a result of the project, which reduces flooding hazard in the project area. **No substantial adverse direct or indirect effects to flooding or other hazards have been identified associated with implementation of Alternative 2A. Impacts would be less than significant (Criterion D). Direct and indirect effects to flooding or other hazards have also been addressed in Section 3.5 Geology/Soils.**

Alternative 1B

<u>Temporary</u>

Temporary impacts as a result of the implementation of Alternative 1B would be similar to those discussed for Alternative 2A. Alternative 1B would require less dredging, grading, and ground disturbance for initial implementation than Alternative 2A, although the general construction approach, including phasing and diking off areas for inundation, would be similar. Construction would be phased, with dry disturbed areas generally limited to staging areas and access road improvements, and wet disturbed areas limited to portions of the lagoon dredged to lower elevations or built up as transitional areas.

Temporary impacts to hydrology could occur during construction activities; during periods of inundation within the lagoon, water levels within diked off areas would increase relative to existing conditions, altering flow regimes. Inundation would last from 3 to 7 months and amounts would range from +5 to +6 feet NGVD depending on basin location and phase of construction (see Table 2-23 for length and amounts of inundation that would occur in each basin during phased construction). As channels are expanded and dikes are formed, water levels would undulate relative to the available cross-sectional area of newly sculpted areas, temporarily altering flow regimes as areas are deepened. Some circulation would continue to occur due to dredge and support equipment movement and wind wave-driven circulation. Water levels would be expected to return to pre-construction elevations once dikes are removed and the lagoon is allowed to fill. Increased erosion and/or siltation would not be anticipated. Figure 2-17 shows those areas that, once dredged, would be exposed as open water channels, tidal mudflats, or salt marsh once re-established by marsh vegetation. Dredged areas would be opened to tidal action, and would begin to naturally revegetate through plant recruitment. Additional planting of specific habitat would also occur, as needed, to facilitate recovery. Periodic maintenance activities would cause temporary dredging of the channels. Since tidal flows in areas subject to erosion/siltation (eastern portions of the project) would remain relatively slow through newly dredged areas, and since areas identified as sensitive to erosion (channel slopes under infrastructure) would be structurally protected as described in Chapter 2, erosion or siltation during construction and maintenance activities would be minimal; impacts would be less than significant. Erosion and sediment control would also be addressed in the project SWPPP that would be developed and implemented by the contractor in compliance with existing regulations (PDF-25) to minimize scour, erosion, and impacts on surface drainage patterns and runoff volumes.

Dikes would incorporate a mechanism to control water elevations and allow the release of water to avoid flooding of adjacent infrastructure and/or roadways during construction. The potential for exposure of people or property to hazards such as flooding would not be increased over existing conditions. **Temporary impacts would not be substantially adverse and impacts would be less than significant related to lagoon circulation and drainage patterns, flooding, erosion or siltation, or increased exposure to water-related hazards (Criteria A, C, and D).**

The lagoon is underlain by an unconfined alluvial groundwater basin that is characterized by exchange with both the overlying lagoon and adjacent ocean waters. Water levels in diked areas of the lagoon would increase during periods of inundation, and hydrologic connectivity between groundwater and the lagoon would not be expected to change as a result of temporary work activities. Construction activities would not substantially alter existing conditions related to the exchange of lagoon and groundwater that could result in a substantial reduction in recharge characteristics. **Impacts would be less than significant (Criterion B). No substantial adverse impacts would occur.**

<u>Permanent</u>

Alternative 1B would increase the hydraulic efficiency of San Elijo Lagoon to a lesser extent than Alternative 2A. The existing inlet would be retained under Alternative 1B, and improved. There is a rock sill located under the existing inlet, which constrains the degree to which tidal exchange between the lagoon and ocean can be increased. The hydraulic conductivity within the main channel would increase because it would be straightened and enlarged, and the channel network within the lagoon basins would be enlarged and extended to improve circulation into the secondary channel network (see Table 2-10 for new channel dimensions at infrastructure crossings under Alternative 1B). Infrastructure would be improved to minimize constrictions at crossings, including removal of the CDFW dike and improvements at I-5 (proposed by Caltrans) and the railroad (proposed by SANDAG). These improvements within the channel network and at key infrastructure crossings would enable the lagoon to drain incoming freshwater more efficiently, both during dry weather flows and storm events. These same improvements to the channel network would increase tidal influence in the east basin of the lagoon.

Drainage patterns and circulation within the lagoon would be altered with implementation of Alternative 1B, but would benefit the lagoon overall with respect to biological resources and water quality, in particular. Circulation would increase with the new inlet and improved channel network. Hydrology throughout the lagoon would be improved through the enhancement of the existing lagoon inlet and enhanced channel flow regimes that would allow freshwater to flow out of the lagoon and promote improved tidal exchange deeper to the inland areas of the lagoon.

Tidal influence would be increased throughout the lagoon by improving the existing inlet, although to a lesser extent than Alternative 2A. The improved inlet configuration would provide less muted flow directly into lagoon channels compared to existing conditions although, as shown in Table 3.2-1, tides would become more muted extending east into the lagoon. The increased tide range would give the lagoon a greater opportunity to flush more readily than existing conditions. The improved inlet would provide additional circulation to the east basin, as well as throughout the central and west basins through the extension of the existing channel network. This additional circulation would promote lower residence times and higher water quality conditions throughout the lagoon compared to existing conditions (discussed in Section 3.4 Water and Aquatic Sediment Quality). Upstream sediment that currently has the opportunity to settle out when water backs up behind the CDFW dike would be able to flush from the lagoon and contribute to the littoral zone. Additional tidal exchange and flushing would result in larger and heavier particle size (sand) in the western portions of the channel system where tidal flows may be faster. In the eastern portions of the project where most of the smaller, lighter sediment particles are located, tidal flushing would be slower and channels would also be resistant to tidal erosion. Structures and strategic infrastructure threatened by erosion during stormflow events would be protected throughout the lagoon by shore protection measures, thus managing erosion during higher-velocity storm flows and preventing damage (PDF-39).

As discussed in Section 3.3 Coastal Processes, under Alternative 1B, the flood bar would remain substantially larger than the volume of the ebb bar. The inlet would remain flood dominated, as it is under existing conditions, although in the dredged condition, tidal exchange between the lagoon and ocean would be increased over existing conditions, as discussed above. Sand would continue to be entrained in the inlet in a developing flood shoal that would require removal each year to maintain an open inlet condition with the predicted tide ranges. The necessity for repeated inlet and/or channel maintenance would continue similar to the current inlet condition, although volumes removed during each maintenance event are anticipated to be slightly greater, as noted in Chapter 2.

Alternative 1B would result in a net decrease in impervious area of 0.23 acre due to removal of the CDFW dike. A permanent launch ramp would be built for a dredge in the central basin as part of Alternative 1B, which would slightly increase impervious areas within the lagoon. The CDFW dike would be removed from the east basin of the lagoon and replaced with vegetated transitional habitat. However, because the dike is being removed from an inundated area, there would be no anticipated change in surface runoff amounts in the lagoon. Increases in impervious area would require proper drainage designs per state and County regulations (i.e., SUSMP, HMP, LID BMPs) to minimize any increase in discharge flow rate, runoff volume, or erosion potential. By complying with the regulatory requirements and properly implementing appropriate BMPs, no significant changes to surface runoff patterns would occur.

Hydrologic improvements associated with Alternative 1B would improve existing constrictions within the lagoon restricting water flow and circulation. This alternative would also improve the ability of the lagoon to drain freshwater currently impounded in the east basin and improve tidal influence throughout the basins. Though changing existing drainage patterns, this alternative would result in a beneficial impact on circulation and surface drainage patterns. The **change to the amount of surface runoff would result in less than significant impacts. No substantial adverse or significant impacts would occur (Criterion A).**

Alternative 1B would enlarge the tidal channel network throughout the lagoon and enhance the ability of the lagoon to drain incoming freshwater flows currently impounded in the east basin, as described above. Water would continue to be present in all of the basins and would not substantially change. The lagoon is currently underlain by an unconfined alluvial groundwater basin that is characterized by exchange with both the overlying lagoon and adjacent ocean waters. The increased tidal circulation within the lagoon **would not represent a substantial change to conditions that influence recharge characteristics. Impacts would be less than significant (Criterion B) and would not be substantially adverse.**

Alternative 1B would enhance the ability of the lagoon to drain fluvial flows to the ocean through improvements to the main channel and infrastructure constriction points, as discussed above. Improved drainage would generally reduce the potential for flooding to occur within the lagoon and along adjacent infrastructure during dry weather flows and small storm events. Flow volumes through the lagoon may increase, creating the potential for erosion in specific locations. As discussed in Chapter 2, infrastructure protection has been incorporated into the project design and these areas would not be susceptible to erosion under higher flow velocities.

Siltation within the lagoon could occur from inputs from upstream fluvial flows, erosion within the lagoon, or sediment entering from the coast. Sediment entering the lagoon has decreased as the upstream watershed has been developed, so siltation due to incoming runoff would not increase substantially under any of the build alternatives. Erosion along the lagoon channels would not be substantial due to protection designed for areas predicted to be susceptible to scour. Directly after construction, there may be exposed soils that could be susceptible to erosion within the lagoon. These areas are anticipated to become vegetated as soils stabilize and natural recruitment or restoration planting occurs, and erosion would be short term and not substantial. Entrainment of sand from the littoral zone entering the lagoon inlet is discussed above in the context of the flood shoal that would develop between maintenance cycles. Alternative 1B would increase the stability of the lagoon inlet but the lagoon would continue to be a flood-dominated system. Sand would continue to enter the lagoon and accumulate into a flood shoal. Sand is relatively large in grain size, however, and typically settles out of the water column relatively quickly. The inlet channel between Coast Highway 101 and the railroad bridge would be protected with riprap along both sides, and would provide a discrete location for the flood shoal to develop without substantially affecting adjacent habitat areas. Shoals would be monitored by SELC on a semi-annual basis and removed during regular maintenance or as-needed (PDF-40). **Impacts to flooding, erosion, and/or siltation would be less than significant (Criterion C). No substantial adverse impacts would occur.**

Alternative 1B would provide flood reduction potential compared to existing conditions. The lagoon channel network and infrastructure improvements would enhance hydraulic connectivity between the lagoon and ocean, and allow fluvial flows to drain from the lagoon more efficiently. As shown in Table 3.2-2, Alternative 1B would reduce flood elevations compared to existing conditions, and Manchester Avenue would not be flooded during the 100-year flood. Flooding of adjacent infrastructure and/or roadways would not occur and the potential for exposure of people and property to flooding and other such water-related hazards would not be increased over existing conditions. Channel and infrastructure improvements would be reviewed by the County, Caltrans, the City of Solana Beach, and the City of Encinitas, as appropriate, prior to approval of project grading plans (PDF-50).

Once construction is completed, a LOMR would be filed to formally modify the FIRM, or FBFM, or both (PDF-49). Similar to Alternative 2A, this alternative would not require a CLOMR, which is needed if a proposed project causes an increase in flood elevation of greater than 1.00 foot and is within a flood area designated as Zone A. Given the nature of the design under Alternative 1B, the LOMR would recognize the net reduction in BFE achieved as a result of the project, which reduces flooding hazard in the project area. **No substantial adverse direct or indirect effects to flooding or other hazards have been identified associated with implementation of Alternative 1B. Impacts would be less than significant (Criterion D).**

Alternative 1A

Temporary

Temporary impacts as a result of the implementation of Alternative 1A would be similar to those discussed for Alternative 1B, but Alternative 1A would require less dredging, grading, and ground disturbance for initial implementation than Alternative 1B, and impacts would be less. Construction would be phased, with dry disturbed areas generally limited to staging areas and access road improvements, and wet disturbed areas limited to portions of the lagoon dredged to lower elevations or built up as transitional areas. The construction approach for Alternative 1A is also different than for Alternative 2A and Alternative 1B and would not include temporary inundation of diked off areas. Instead the dredge would remain within the main channel network, limiting bottom sediment disturbance within the lagoon. Increased erosion and/or siltation would not be anticipated because velocities within the channels/lagoon would not substantially change from existing conditions during construction. Erosion and sediment control would also be addressed in the project SWPPP that would be developed and implemented by the contractor in compliance with existing regulations (PDF-25).

The construction approach proposed for Alternative 1A would not alter the current circulation within the lagoon, and the potential for exposure of people or property to hazards such as flooding would not be increased over existing conditions. **Temporary impacts would not be substantially adverse and less than significant impacts would occur to lagoon circulation and drainage patterns, flooding, erosion or siltation, or increased exposure to water-related hazards (Criteria A, C, and D).**

The lagoon is underlain by an unconfined alluvial groundwater basin that is characterized by exchange with both the overlying lagoon and adjacent ocean waters. Hydrologic connectivity between groundwater and the lagoon would not be expected to change as a result of temporary work activities. Construction activities would not substantially alter existing conditions related to the exchange of lagoon and groundwater that could result in a substantial reduction in recharge characteristics. **Impacts would be less than significant (Criterion B). No substantial adverse impacts would occur.**

Permanent

Alternative 1A would increase the hydraulic efficiency of San Elijo Lagoon to a lesser extent than Alternative 2A or Alternative 1B. The existing inlet would be retained under Alternative 1A, and improved. There is a rock sill located under the existing inlet, which constrains the degree to which tidal exchange between the lagoon and ocean can be increased. The hydraulic conductivity within the main channel would increase because it would be straightened and enlarged, although the secondary channel network within the lagoon basins would not be modified under Alternative 1A, limiting hydrologic improvements to the main channel and adjacent areas. Infrastructure would be improved to reduce constrictions at crossings, including the installation of two culverts through the existing CDFW dike and improvements at I-5 (proposed by Caltrans) and the NCTD railroad (proposed by SANDAG). Improvements within the main channel and at key infrastructure crossings would enable the lagoon to drain incoming freshwater more efficiently compared to existing conditions, both during dry weather flows and storm events. These same improvements would increase tidal influence in the east basin of the lagoon.

Drainage patterns and circulation within the lagoon would be altered with implementation of Alternative 1A, but would benefit the lagoon overall with respect to biological resources and water quality, in particular. Circulation would increase with the new inlet and improved main channel, although benefits would be smaller than those identified under Alternative 2A or Alternative 1B.

Tidal influence would be increased compared to existing conditions by improving the existing inlet, although to a lesser extent than Alternative 1B in the central and east basins. The improved inlet configuration would provide less muted flow although, as shown in Table 3.2-1, tides would become more muted extending east into the lagoon. The improved inlet would provide additional circulation to the east basin, as well as throughout the central and west basins, although these improvements would be primarily limited to the main channel.

As discussed in Section 3.3 Coastal Processes, under Alternative 1A, the flood bar would remain substantially larger than the volume of the ebb bar, similar to existing conditions. The inlet would remain flood dominated, although in the dredged condition, tidal exchange between the lagoon and ocean would be increased over existing conditions, as discussed above. Sand would continue to be entrained in the inlet in a developing flood shoal that would require removal each year to maintain an open inlet condition with the predicted tide ranges. The necessity for repeated inlet and/or channel maintenance would continue similar to the current inlet condition, although volumes removed during each maintenance event are anticipated to be slightly greater, as noted in Chapter 2. As noted above, the CDFW dike would remain in place, with the addition of two culverts to promote fluvial water flow from the watershed to the ocean, resulting in no measurable decrease in impervious surfaces. No structures that would increase impervious area within or adjacent to the lagoon are proposed as part of Alternative 1A. A temporary dredge launch ramp would be installed during construction and would be removed after construction. Alternative 1A would not result in a change in impervious area, and therefore would not substantially affect surface runoff into the lagoon.

Hydrologic improvements associated with Alternative 1A would improve existing constrictions within the lagoon restricting water flow and circulation. This alternative would also improve the ability of the lagoon to drain freshwater currently impounded in the east basin and improve tidal influence throughout the basins. Though changing existing drainage patterns, this alternative would result in a beneficial impact on circulation and surface drainage patterns. **No impact in surface runoff would occur. No substantial adverse or significant impacts would occur (Criterion A).**

Alternative 1A would enlarge the main channel in the lagoon and enhance the ability of the lagoon to drain incoming freshwater flows currently impounded in the east basin, as described above. Water would continue to be present in all of the basins and would not substantially change. The lagoon is currently underlain by an unconfined alluvial groundwater basin that is characterized by exchange with both the overlying lagoon and adjacent ocean waters. Measurable exchange between the lagoon and groundwater is likely limited to the alluvial aquifer (discussed above under Groundwater Hydrology)**.** The increased tidal circulation within the lagoon **would not represent a substantial change to conditions that influence groundwater recharge characteristics, and impacts would be less than significant (Criterion B) and impacts would not be substantially adverse.**

Alternative 1A would enhance the ability of the lagoon to drain fluvial flows to the ocean through improvements to the main channel and infrastructure constriction points, as discussed above. Improved drainage would generally reduce the potential for flooding to occur within the lagoon and along adjacent infrastructure during dry weather flows and small storm events. Flow velocities through the lagoon may increase, creating the potential for erosion/siltation in specific locations. As discussed in Chapter 2, infrastructure protection has been incorporated into the project design and these areas would not be susceptible to erosion under higher flow velocities.

Siltation within the lagoon could occur from inputs from upstream fluvial flows, erosion within the lagoon, or sediment entering from the coast. Sediment entering the lagoon has decreased as the upstream watershed has been developed, so siltation due to incoming runoff would not increase substantially under any of the build alternatives. Erosion along the lagoon channels would not be substantial due to protection designed for areas predicted to be susceptible to scour. Directly after construction, there may be exposed soils that could be susceptible to erosion within the lagoon. These areas are anticipated to become vegetated as soils stabilize and natural recruitment or restoration planting occurs, and erosion would be short term and not substantial. Entrainment of sand from the littoral zone entering the lagoon inlet is discussed above in the context of the flood shoal that would develop between maintenance cycles. Alternative 1A would increase the stability of the lagoon inlet but the lagoon would continue to be a flood-dominated system. Sand would continue to enter the lagoon and accumulate into a flood shoal. Sand is relatively large in grain size, however, and typically settles out of the water column relatively quickly. The inlet channel between Coast Highway 101 and the railroad bridge would be protected with riprap along both sides, and would provide a discrete location for the flood shoal to develop without substantially affecting adjacent habitat areas. Shoals would be monitored by SELC on a semi-annual basis and removed during regular maintenance or as-needed (PDF-40). **Impacts to flooding, erosion, and/or siltation would be less than significant (Criterion C). No substantial adverse impacts would occur.**

Alternative 1A would provide limited flood reduction potential compared to existing conditions. Although the lagoon channel network and infrastructure improvements would enhance hydraulic connectivity between the lagoon and ocean and allow fluvial flows to drain from the lagoon more efficiently, physical constraints with the existing inlet (i.e., long, sinuous, and narrow/shallow channel) would limit flood elevation reductions. As shown in Table 3.2-2, Manchester Avenue would continue to be flooded during 100-year floods in three locations within the east basin (East Basins 2, 3, and 4), although overall flood elevations in those locations would be reduced from existing conditions. No increases in 100-year flood elevation of more than 1 foot would occur. Flooding of adjacent infrastructure and/or roadways would not occur and the potential for exposure of people and property to flooding and other such water-related hazards would not be increased over existing conditions. Channel and infrastructure improvements would be reviewed by the County, Caltrans, the City of Solana Beach, and the City of Encinitas, as appropriate, prior to approval of project grading plans (PDF-50).

Once construction is completed, a LOMR would be filed to formally modify the FIRM, or FBFM, or both (PDF-49). Similar to Alternatives 2A and 1B, this alternative would not require a CLOMR, which is needed if a proposed project causes an increase in flood elevation of greater than 1.00 foot and is within a flood area designated as Zone A. Given the nature of the design under Alternative 1A, the LOMR would recognize the net reduction in BFE achieved as a result of the project, which reduces flooding hazard in the project area. **No substantial adverse direct or indirect effects to flooding or other hazards have been identified associated with implementation of Alternative 1A. Impacts would be less than significant (Criterion D).**

No Project/No Federal Action Alternative

Under the No Project/No Federal Action Alternative, tidal flows would continue to be restricted due to the narrow and meandering channel between Coast Highway 101 and the railroad, and the presence of a sill underlying the inlet. Tidal ranges would continue to be muted for both high and low tides, while progressively increasing from the west basin through the east basin. As a result, poor lagoon circulation (i.e., tidal exchange), surface water drainage, and flood protection would remain the same as current conditions if no alternative is implemented. There would be no change to surface runoff. No changes to groundwater interaction would occur.

The No Project/No Federal Action Alternative would maintain flood elevations along the east basin and Manchester Avenue that exceed the road elevation by several feet (Table 3.2-2). This is no change from existing conditions; therefore, no additional impact would result to the potential for exposure of people or property to water-related hazards such as flooding. Under the No Project/No Federal Action Alternative, the condition of stormflows being retarded by constricted channels and bottlenecks under Coast Highway 101 and the I-5 bridges would continue, thus elevating water levels more than would occur with restoration. If the I-5 bridge is replaced and the lagoon is not restored, then it is expected that stormflows would drop in elevation east of I-5, but would rise west of I-5.

There is no change from the No Project/No Federal Action Alternative to the potential for erosion and siltation. The lagoon would continue to have restricted circulation due to the hydraulically inefficient channel system with several choke points in the system. In addition, annual maintenance would be required to remove the accumulated flood shoal and keep the inlet open. **No substantial adverse effects would be anticipated under the No Project/No Federal Action Alternative, and impacts would be less than significant, although benefits associated with the build alternatives would not be realized (Criteria A through D).**

3.2.4 Avoidance, Minimization, and Mitigation Measures

Although the project would offer a net benefit to overall lagoon hydrology through the improved channel network, increased tidal exchange, and circulation, construction and post-construction activities would be required to adhere to various federal, state, and local standards. By successfully complying with these measures, impacts associated with construction- and operation-related impacts would be minimized through LID, site design, and/or structural BMPs mandated by these measures. Given the compliance with required stormwater permits, as well as conformance to proper BMP design, implementation, and maintenance mandated by permits and associated regulations, no significant or substantially adverse impacts to hydrology would be expected as a result of SELRP implementation. No mitigation measures are required.

The following measures describe existing policies, regulations, and procedures aimed at reducing potential impacts related to hydrology:

- Implementation of the SELRP would require compliance with the Construction General Permit Order 2009-0009-DWQ (as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ). Under the Construction General Permit, a project-specific SWPPP would be implemented. The SWPPP would specify measures and would include proper runoff controls and pollutant source controls to avoid or minimize construction-related impacts to surface drainage patterns, amount of surface runoff, erosion, and flooding. Project construction would comply with all provisions described in the Construction General Permit and would strictly follow the SWPPP. The SWPPP would also address the following project-specific practices:

- Clearing and grading of native vegetation would be limited to the minimum amount needed if earthwork is conducted during the wet season.
- Storm water and erosion controls would be installed prior to soil disturbance on the construction site. Where determined necessary, silt fencing, straw wattles, temporary earthen berms, or similar runoff barriers would be placed along the perimeter of the project site using methodologies and orientations appropriate to control erosion. The fence would be buried at the bottom and staked. Points of discharge from these BMPs or other points of concentrated runoff would employ scour/erosion control. Silt fencing, straw wattles, earthen berming, or a similar barrier would be placed around the perimeter of the project site and properly installed and maintained.
- Stockpiles of soil, concrete, and other materials would be covered with a tarp or blanket and/or surrounded with straw wattles or gravel bags. Slopes would be protected with straw wattles or blankets. All straw wattles would be certified as weed-free.
- Whenever possible, grading would be phased to limit soil exposure and minimize potential sediment transport. Finished areas would be revegetated and/or hydroseeded as soon as possible with native species known to exist in the project site.

- Once construction is completed, an operations and maintenance program would be implemented in accordance with Municipal NPDES Permit Order No. R9-2013-0001, which would be implemented for the life of the project to ensure the continued effectiveness of post-construction BMPs. Maintenance activities would vary from area to area depending on the BMPs in place, but would include the following:
  - Mowing and maintaining vegetated BMPs (e.g., maintaining swales and/or detention/retention systems to original cross sections and infiltration rates).
  - Seeding or sodding to restore or maintain ground cover.
  - Repairing erosion areas and stabilizing repairs with additional erosion-control measures.

  - Removing and replacing all dead and diseased vegetation as necessary to maintain vegetation coverage and minimize erosion. Replacement vegetation would not include any invasive species.

- The SELRP would implement LID features for the long-term post-construction (operational) phase. Water-quality benefits would be provided through LID designs, source controls, and treatment controls. The following features would be considered:
  - Removing and replacing all dead and diseased vegetation as necessary to maintain vegetation coverage and minimize erosion. Replacement vegetation would not include any invasive species.
  - The SELRP would implement LID features for the long-term post-construction (operational) phase. Water-quality benefits would be provided through LID designs, source controls, and treatment controls. The following features would be considered:
  - Integrating vegetated swales, infiltration strips, or similar earth-based vegetated system for accepting and conveying runoff associated with permanent impervious features.
  - Optimizing the use of suitable pervious materials for hardscaped surfaces where applicable (e.g., porous pavements, gravel walkways, grass pavers).
  - Maximizing soft-bottom areas that are amenable to vegetative planting and natural treatment of runoff.
  - Integrating natural rock or similar material for protection against scour and sediment transport at discharge points and on soft-bottom drainages.

3.2.5 Level of Impact After Mitigation

CEQA conclusion: Impacts to hydrology would be less than significant due to implementation of the SELRP.

NEPA: No substantial adverse impacts to hydrology have been identified due to implementation of the SELRP.

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3.3 OCEANOGRAPHY/COASTAL PROCESSES

Beaches are dynamic environments subject to seasonal and annual movement of sand offshore and onshore, as well as alongshore within a generally defined littoral cell. Modification of structures or water body connections to the coast (e.g., lagoon inlets) can also influence sand movement, or transport, in a littoral cell.

This section is based largely on information from the SELRP Shoreline Morphology Report (M&N 2012a) and the Coastal Regional Sediment Management Plan (SANDAG 2009). For that report, available literature was reviewed to determine existing conditions within the project area to analyze the fate of the beach fills. The *Coast of California Storm and Tidal Wave Study, San Diego Region* was a source of data on coastal conditions, including waves, the sediment budget, and longshore sediment transport data (Corps 1990, 1991). Other studies include a 1994 Shoreline Erosion Assessment and Atlas of the San Diego Region (California Department of Boating and Waterways and SANDAG 1994, referred to herein as DBW/SANDAG 1994) and a study of littoral cells and sand budgets in California (Patsch and Griggs 2006, 2007). Information from the 2012 RBSP EIR/EA is also referenced, as appropriate.

The function of a complex system like a lagoon is not easily captured in the template of an EIR/EIS. Accordingly, Section 3.2 Hydrology and Section 3.4 Water and Aquatic Sediment Quality address tidal dynamics within the lagoon, as well as tidal exchange between the lagoon and ocean in the context of water quality. Section 3.4 also addresses water quality within the ocean as it relates to placement of disposal/reuse materials. Section 3.6 Biological Resources addresses potential biological impacts associated with the dispersion of sand placed as part of materials disposal/reuse. Long-term sea level rise and potential extreme events associated with climate change are discussed in Section 3.16 Global Climate Change and Greenhouse Gas Emissions of this document.

3.3.1 AFFECTED ENVIRONMENT

This discussion is focused on the Oceanside Littoral Cell, which encompasses San Elijo Lagoon and the onshore and nearshore materials placement sites, and is adjacent to offshore stockpiling sites. Specific conditions at San Elijo Lagoon and the proposed materials disposal/reuse sites follow the broader overview of coastal geomorphology.

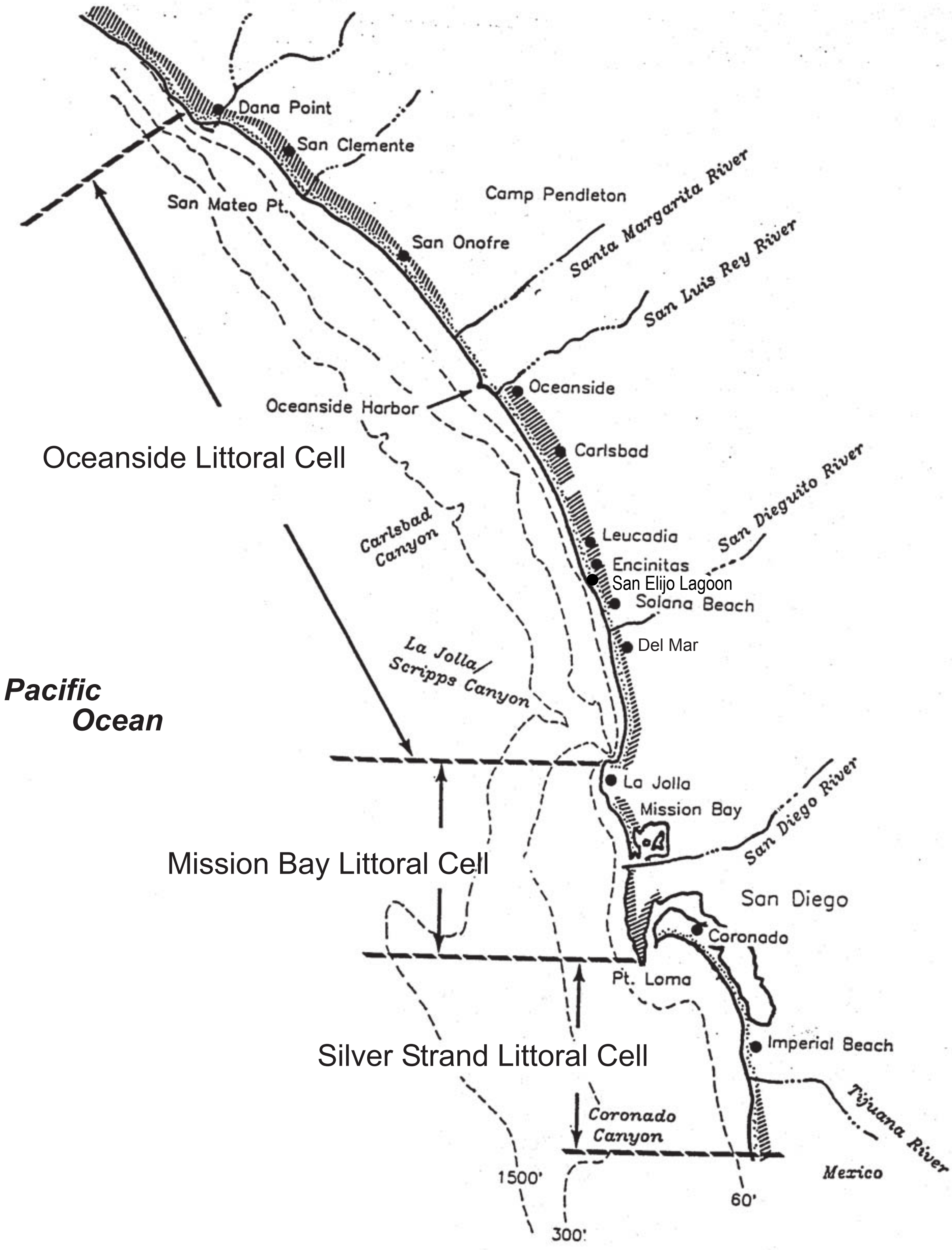
Coastal Geomorphology

The project study area extends from the City of Encinitas south to the northern end of the City of San Diego, within San Diego County. The coastal area in this portion of the County is characterized by sandy/cobble beaches that vary in width and sand cover both seasonally and annually. The study area is located entirely within or adjacent to the Oceanside Littoral Cell, with the exception of LA-5, which is located approximately 30 miles south, 6 miles offshore of the Mission Bay Littoral Cell. The southern half of the Oceanside Littoral Cell stretches from Oceanside to La Jolla[3] and includes the shorelines of the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, and La Jolla, and encompasses the project study area. The littoral cells located in San Diego County are illustrated in Figure 3.3-1.

A littoral cell is a coastal reach bounded by physiographic features (e.g., submarine canyons, coastal headlands, harbors, etc.) where sediment enters, moves along, and leaves the coast. The littoral cell is a segment of coastline that does not naturally transport or receive littoral sediment to or from another cell in either the "upcoast" or "downcoast" direction (Corps 1991). However, within the cell, a complete cycle of sedimentation exists that can include erosion of highland terrain, fluvial transport to the shoreline, and littoral transport along the shoreline. Once sediment is entrained in the littoral transport system, it can be lost from that system by cross-shore transport offshore or by channeling it into a deep basin via a submarine canyon. Sediment sources to a cell include beaches, rivers, bluffs, offshore deposits, bypassing, and artificial nourishment. Sediment sinks are submarine canyons, offshore deeper-water areas, inland lagoons, and harbors. Beaches and the nearshore zone represent storage areas within a littoral cell. The sediment budget is either in balance with stable beaches, in a surplus with growing beaches, or in a deficit with narrowing beaches. The portion of the Oceanside Littoral Cell encompassing the project study area is in a deficit of nearly 55,000 cubic yards per year (cy/yr), as evidenced by widespread beach retreat since the early 1980s (DBW/SANDAG 1994) into the present (Patsch and Griggs 2006, 2007).

Bounded on one side by the landward limit of the beach and extending seaward beyond the area of breaking waves, the seaward edge of an active littoral cell is defined as its depth of closure. Substantial quantities of sand from coastal littoral cells do not usually travel outside of this depth and into the deeper ocean in large quantities, except during severe coastal storm wave events. Typically in the San Diego region, greater sand movement from the shallow portion of the beach profile to the deeper portion of the profile within the littoral zone occurs in the winter due to large storms and waves, followed by a period of sand gain to the shallow portion of the beach profile during the summer's more gentle conditions and surf. Thus, the exposed portion of the beach is generally wider in the summer and narrower in the winter. These combined seasonal processes,

[3] The northern half of the Oceanside Littoral Cell extends from Oceanside to Dana Point in Orange County.



Source: Moffatt & Nichol Engineers

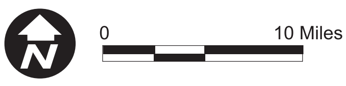


Figure 3.3-1
Littoral Cells in the San Diego Region

including both winter and summer sand shifts, compose a complete cross-shore sedimentation cycle. Longshore sand transport occurs continually and also varies seasonally. Insufficient shoreward energy generally exists to move sand from outside the depth of closure back into the littoral cell. Sand located or carried outside of the depth of closure essentially exits the littoral cell and is no longer available to naturally replenish beaches during the summer. In San Diego, the depth of closure ranges from approximately -13 to -32 feet mean sea level (msl) (Coastal Frontiers 2010b). The proposed offshore stockpile areas of SO-5 and SO-6 are located outside (deeper than) the depth of closure and therefore do not have measurable exchange with the nearshore/beach sand volumes.

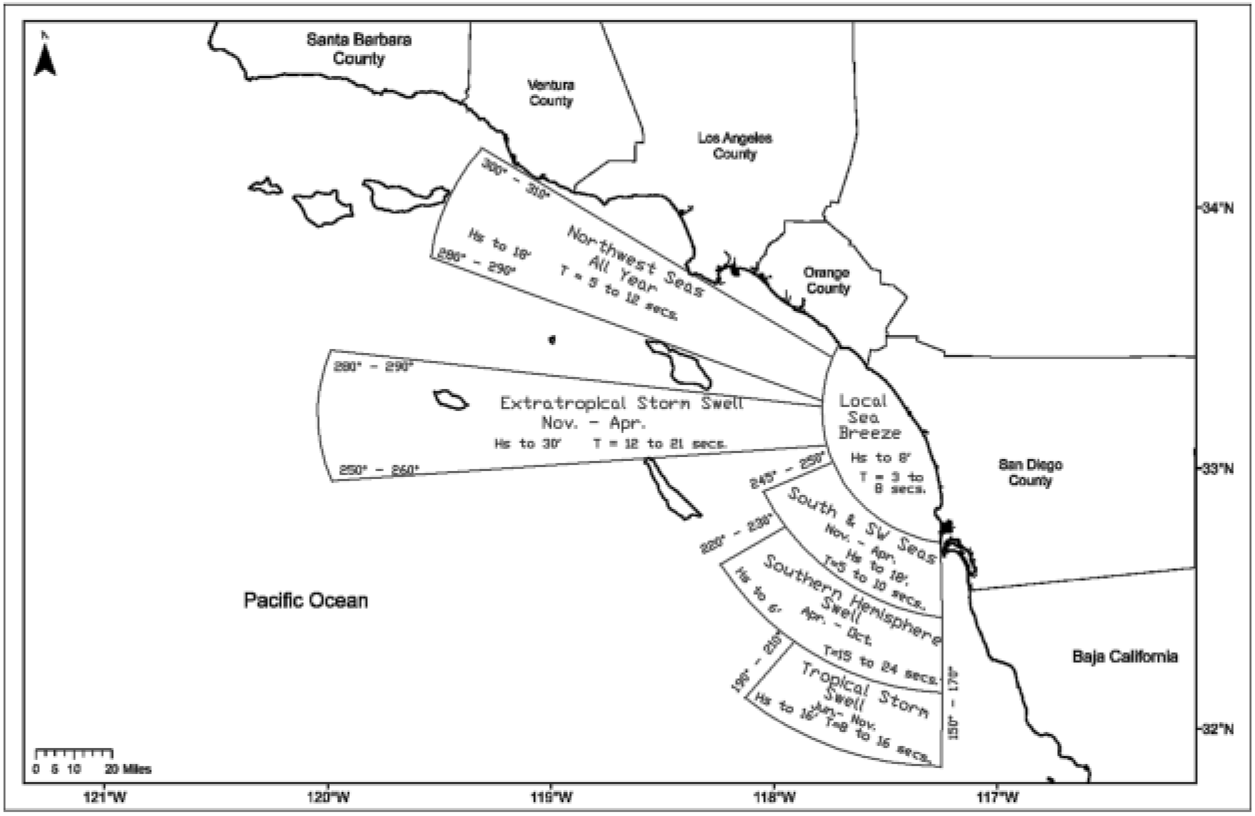
Net sediment transport within the Oceanside Littoral Cell occurs to the south (Corps 1991), with minor seasonal reversals in the dominant sediment transport direction that can extend over longer periods of years. Summer and fall seasons are typically dominated by southern hemisphere swells that generate currents and sediment transport to the north. Winter and spring seasons are typically dominated by northern hemisphere swells that generate currents and sediment transport to the south. The wave exposure window at San Elijo Lagoon is shown in Figure 3.3-2. This winter/spring condition is typified by higher energy waves than summer/fall conditions and so the southern transport tends to be the dominant process over the long term.

Site-specific conditions in the vicinity of San Elijo Lagoon show a higher-than-average occurrence of reversals of the longshore transport and direction due to local bathymetry and wave refraction at Cardiff reef (Coastal Environments 2001). As a result, the net longshore sediment transport rate is reduced in the vicinity of the existing inlet. High volumes of cobble are also contained in the littoral zone adjacent to San Elijo Lagoon. Other site-specific conditions relate to the location of the existing inlet and Coast Highway 101 along the west edge of the lagoon, protecting the interior of the lagoon from intensive wave action during storm events and in the event of tsunami.

San Elijo Lagoon Study Area

The inlet at San Elijo Lagoon is constrained in its location by the existing Coast Highway 101 crossing, then by the railroad trestle located southeast of the inlet. The resulting channel extending east from the inlet is sinuous as it passes under those two infrastructure crossings, and water velocities exiting the lagoon are not sufficient to counteract the offshore longshore sand transport to maintain a stable, open connection with the ocean. There is a rock sill located just offshore under the beach (approximately 4 feet NGVD) at the Coast Highway 101 crossing, which further constrains the ability of the inlet to maintain an open condition once manually opened.

Figure 3.3-2
Wave Exposure Window of San Elijo Lagoon



The inlet is bounded on the north by a small bluff, with an occasional front-beach extending south of the bluff into the channel. South of the inlet, the sandy beach is characterized by varying widths and is backed by a parking lot. Sand dredged from the lagoon inlet during manual maintenance/opening is placed on the beach south of the inlet mouth as part of the sand bypassing process, and results in generally wider beaches for a period after maintenance occurs.

Ebb Bar Development

Longshore transport of sand within a littoral cell results in a "river of sand" moving parallel to the shoreline. As this "river" crosses river and lagoon mouths that are open to tidal action, the cross-current action of an outgoing or incoming tide deflects material from its parallel movement. This leads to sand bar formation either out into deeper water (ebb bar) or into the water body itself (flood shoal).

At San Elijo Lagoon, tidal hydrodynamics and ocean waves lead to both sand bar formation off the lagoon mouth in an ebb bar and within the lagoon in a flood shoal. Ebb bars can cause changes to incoming ocean waves and consequent changes to the shoreline. Flood shoals can mute tides in a lagoon and result in changes to hydrology affecting habitat and water quality. This section addresses the existing ebb bar located adjacent to the San Elijo Lagoon inlet and ebb bars that may develop as part of project implementation. Section 3.2 Hydrology addresses flood shoal development within the lagoon in the context of hydrology.

The existing ebb bar at San Elijo Lagoon is estimated to be located relatively close to the inlet (at -10 feet NGVD) and contain approximately 3,600 cy of sand (M&N 2012a). Waves typically limit ebb bar growth by resuspending and transporting sediment either into the inlet (i.e., to build the flood shoal) or to the downdrift beach (i.e., bypassing the inlet). The flood shoal is estimated to contain approximately 63,300 cy of material, resulting in a relatively unstable inlet due to a system that is clearly flood-dominated (e.g., more material is entrained into the lagoon inlet than is scoured from the lagoon and inlet by ebb tides).

Inundation Conditions

The interior of the lagoon and structures along its perimeter are currently protected from high wave energy along the beaches during coastal storm wave events. The west and central basins of the lagoon are mapped within the tsunami inundation area by the California Emergency Management Agency (2009). The combined protective effects of a nearly continuous high earthen dike supporting Coast Highway 101 along the entire west boundary of the lagoon, and the relatively narrow tidal inlet mouth and long sinuous inlet channel, shield the lagoon from much of the wave energy associated with large coastal storm wave events.

Materials Disposal/Reuse Study Area

LA-5

LA-5 is located outside of the littoral zone, in approximately 480 to 650 feet of water. The depth of the site results in a relatively undisturbed bottom, regardless of the more surficial current and wave patterns. As a result, it is only slightly affected by the processes that result in sediment transport in the littoral zone.

SO-5/SO-6

SO-5 and SO-6 are outside of the depth of closure in approximately 35 to 56 feet of water. While there may be some sediment movement within and adjacent to the sites, particularly during severe storm events when wave energy is high enough to move sand from the beach/nearshore past the depth of closure, this transport volume is very low. Surveys conducted at SO-5 between

2000 and 2009 indicated that after dredging conducted for 2001 RBSP, the borrow site had accumulated approximately 1 foot of material, but the bathymetric changes remained identifiable 8 years after the material was removed. The bathymetric difference between the borrow sites and adjacent areas is likely to continue in the foreseeable future because the material that would fill the dredge area results from infrequent, powerful storm events (SANDAG 2011).

Beaches and Nearshore

Coastal processes that drive beach conditions within the southern portion of the Oceanside Littoral Cell are generally common to the proposed nearshore and onshore sand placement sites. Leucadia and most of Solana Beach are primarily narrow beaches backed by bluffs that are frequently subjected to direct wave energy. Moonlight, Cardiff, and Torrey Pines beaches, as well as a segment of Solana Beach directly adjacent to Fletcher Cove, are generally slightly wider beaches, with some bluff and/or reef protection that helps support the creation of pocket beaches. In addition, some of these beaches, including Moonlight, Cardiff, and Torrey Pines, benefit from consistent nourishment through either opportunistic placement (Moonlight) or lagoon bypassing, in which sand entrained in lagoons is removed and placed on adjacent beaches downcoast to enable the sand to continue to follow longshore drift patterns (Cardiff and Torrey Pines). While an existing ebb bar is located off of the San Elijo Lagoon inlet, it is relatively small and close to shore, potentially constrained by Cardiff Reef located farther offshore.

Coastal Lagoons/Wetlands

Sand moving alongshore can become trapped behind coastal structures and inlets, leaving less sand downcoast for transport, and potentially creating a flood shoal that can close the mouth, with adverse impacts to the system. Regular maintenance at structures and lagoons minimizes water body closure/constriction at ocean interfaces and replenishes downcoast beaches by bypassing trapped sand. A series of open lagoon mouths exists along the San Diego County coast. There are three lagoons in proximity to the beaches where material dredged from San Elijo Lagoon may be placed for beneficial reuse. These lagoons are:

- Batiquitos Lagoon – This lagoon was restored between 1994 and 1997, with stabilization of the entrance with jetties and dredging of approximately 2 mcy of sand from the wetlands. The ocean inlet remains open continuously and is subject to sedimentation under existing conditions. Maintenance dredging is performed periodically by CDFW, according to available funding and permits, with sand placed mainly south of the entrance channel.

- San Dieguito Lagoon –Creation of coastal wetland habitat occurred by 2009. The mouth is not stabilized by jetties; it is scheduled for annual excavation of sand by Southern California Edison with placement on the beach on both sides of the entrance channel.
- Los Peñasquitos Lagoon – This lagoon mouth is not stabilized by jetties and is subject to closure due to its relatively small tidal prism and frequent blockage by sand and cobbles; it is annually excavated of sand by the Los Peñasquitos Lagoon Conservancy with placement on the beach south of the entrance channel. The amount of excavated material varies up to 35,000 cy (Hastings 2010).

Buena Vista and Agua Hedionda lagoons are farther north from the project area and are not likely to be potentially affected by sand transport from the beneficial reuse, and therefore are not discussed further.

3.3.2 CEQA Thresholds of Significance

A significant impact related to oceanography/coastal processes would occur if implementation of the proposed project would substantially:

A. Increase the erosion rate of beach sediment resulting in long-term loss to area beaches downcoast from the lagoon;

B. Disrupt the littoral system due to changes in inlet configuration, ebb bar prefilling, maintenance dredging, or sand placement for disposal/reuse;

C. Increase risks of damage to coastal structures, including inundation by wave refraction seiche, tsunami, or mudflow; or

D. Increase the volume of area lagoon sedimentation from sand accretion to a level that results in additional maintenance frequency (not removal of larger volumes) compared to historic requirements. This threshold is considered in relation to material reuse only.

The CEQA thresholds of significance for coastal processes were derived from a combination of thresholds listed in Appendix G of the CEQA Guidelines and thresholds used in the EIR/EIS for the San Dieguito Wetland Restoration Project (SCH #98061010) and the 2012 RBSP EA/EIR (SCH #2020051063). Thresholds from these projects were considered in addition to those provided by County CEQA guidance documents in order to consider effects specific to the littoral system, which is unique to coastal projects.

3.3.3 Environmental Consequences

This section discusses the environmental consequences, or impacts, associated with the proposed project related to oceanography/coastal processes. Potential adverse, significant, or beneficial direct and indirect impacts are identified as appropriate.

Numerical modeling was used to simulate changes in shoreline morphology from the SELRP project. The project was modeled with the Coastal Engineering Design and Analysis System (CEDAS), which uses a numerical model called GENESIS as a base program for shoreline movement modeling by predicting longshore sediment transport. GENESIS is intended to provide a generalized long-term trend in shoreline response from a specific action or actions. Numerical modeling of shoreline morphology is inherently imperfect because of the complexity of coastal processes. There is no comprehensive numerical model that accounts for the natural processes of coupled longshore and cross-shore sediment transport. To address cross-shore transport for this project, a subsequent beach profile analysis was conducted to convert GENESIS shoreline results into sand thicknesses (depth of sand cover) from project alternatives at specific locations within the project study area. The results anticipate general areas of accretion or erosion rather than predict site-specific increments of shoreline movement over time. In addition, modeling was conducted to estimate ebb and shoal bar development at San Elijo Lagoon under each of the proposed alternatives (M&N 2012a).

Coastal wetlands have the potential to be affected by materials placement within the littoral zone, so that discussion is only included under the Materials Disposal/Reuse analysis.

Lagoon Restoration

Alternative 2A

Construction of a new tidal inlet to San Elijo Lagoon has the potential to change the way in which sand and waves act in proximity to the lagoon. Generally, sand deposited in an ebb bar or flood shoal is removed from littoral drift (at least temporarily, until a flood shoal is bypassed through inlet management) and does not settle on adjacent beaches or in the littoral zone. If the inlet changes substantially enough to modify volumes stored in an ebb bar, sand could be removed from Cardiff Beach to create that bar unless sand is provided by another source. The proposed project would have a larger inlet at a new location. This new ebb bar is predicted to have a volume of approximately 345,000 cy at equilibrium. This is a substantial increase from the existing ebb bar of 3,600 cy at the current inlet.

The ebb bar would be larger than the volume of the flood bar (266,000 cy) and the new inlet would result in a more tidally stable ebb-dominated system. The project would "prefill" the ebb bar through the proposed nearshore and onshore placement of material at Cardiff State Beach. This approach is similar to that taken at other coastal lagoon restoration projects (e.g., Bolsa Chica Lowlands Restoration Project). Prenourishing the littoral cell in the vicinity of the site during construction with sufficient sand to offset the total quantities of sand stored in the bars would minimize the effect of the new inlet configuration on beach sand erosion and would result in less than significant effects to beach erosion. Lagoon maintenance dredging and placement of that material downcoast would effectively return that sand to the littoral zone. This **bypassing would offset the effects of sand storage in the flood bar and would result in less than significant impacts to beach erosion downcoast (Criterion A). No substantial adverse impacts would occur to downcoast beach erosion.**

As described above, the littoral zone encompasses the beach and nearshore area along the coast, extending out to the depth of closure located past the surf zone. Sand placement to prenourish the littoral zone onshore at Cardiff would not change the bathymetry of the bottom substantially enough to modify wave patterns, water currents, or sand transport pattern. However, installation of an ebb bar would change bathymetry and wave patterns over a relatively small area of the littoral cell and could provide a surfing benefit. These localized effects are discussed further in Section 3.1 Land Use. Coastal sediment transport systems operate on a large scale and are dominated by wave climate and sediment supply, and the relatively small ebb bar form created off Cardiff is not sufficiently large to modify large-scale coastal currents and sediment transport. Several similar bars have been installed or have formed naturally off other lagoons (i.e., Batiquitos Lagoon, Bolsa Chica, and Huntington Beach Wetlands) and have resulted in relatively small-scale changes to wave breaking patterns, but not large-scale changes to wave-driven current patterns and sediment transport (M&N 2013). Therefore, no changes to littoral processes from the SELRP are anticipated, and **no substantial adverse impacts to the littoral system would occur. Impacts would remain less than significant (Criterion B).**

Sand placement on the beach and in the nearshore is anticipated to result in a wider beach in front of the proposed inlet and along the remainder of Cardiff State Beach on a temporary basis. The proposed project would construct a new inlet with CBFs to enhance inlet stability, and would raise Coast Highway 101 to an elevation that would provide adequate clearance. The raised roadway would be protected on the ocean side with riprap (as presently exists) and designed to resist damage due to extreme storm events (PDF-38 and PDF-39), as required. NCTD is also proposing to raise the existing railroad trestle to accommodate additional flows as part of the double-tracking project, and to potentially allow a dredge to pass beneath the new bridge while performing maintenance dredging.

Ocean waves would propagate through the new tidal inlet and into the lagoon. This process would occur typically at higher tides and/or during high wave events. The CBFs would serve to reduce incoming wave energy by blocking a portion of incident wave energy at the inlet mouth. Wave properties change as they pass from the ocean through the constrained inlet channel and then into the west and central basins. Waves typically diverge, or “fan-out,” as they enter the inlet channel, and then conserve much of their energy while in the channel. Wave divergence results in loss of energy and height from their original ocean condition as they move inland. Waves also lose energy to friction with the inlet bed and banks as they continue to move upstream. Waves would reach the west basin and then diverge further and spread out toward the broader basin boundaries, continuing to diverge as they move toward the central basin. The shape of the west and central basins is intentionally designed as one large oval to maximize wave divergence and energy loss. Waves tend to focus on protrusions into basins and this can cause erosion, so the project design has no protrusions in the basins. As such, ocean waves would become substantially smaller and less energetic as they pass into the basin(s) and should not result in significant erosion. There is a chance that the mudflat area east of the full tidal basin in the central basin may experience some small-scale erosion under certain conditions, but that process would be localized within lagoon habitat areas and would be anticipated to result in shifting of sediment into another portion of the basin, creating similar habitat, so no net loss of habitat is expected. Erosion would not extend into adjacent infrastructure or coastal structures within the lagoon **and significant impacts to coastal structures from inundation through wave refraction would not occur (Criterion C). No substantial adverse impacts are anticipated.**

In the event of tsunami, additional areas of inundation are not anticipated to occur. Tsunami inundation under Alternative 2A should be the same as for existing conditions, as the wavelength is so long that the relative lengths of both tidal inlet channels would not substantially dampen the water level increase. The greater risk posed by tsunamis is the high velocity of the return flow from the lagoon back to the sea. Scour of bridge piles and abutments occurs from extremely high ebb flows. The new bridges at the railroad and at Coast Highway 101 under Alternative 2B would possess deep pile foundations and well-protected abutments (PDF-38), thus protecting them adequately from scour associated with tsunamis. SANDAG prepared a sea level rise study (SANDAG 2013) for the region with recommendations on pile foundations and abutment protection for bridges spanning County wetlands. These design recommendations would be included in the proposed project bridges (PDF-37). No increased risk of inundation of coastal structures would result from project implementation.

While the raised Coast Highway 101 and railroad bridges would enable additional flow to enter the lagoon, coastal structures within the lagoon are located on the perimeter or farther east, where additional exposure to inundation would not be substantial. Immediately along the beach, the addition of sand would temporarily provide additional protection to businesses along Coast Highway 101, including Restaurant Row. **No substantial adverse or significant impacts would result with respect to risks of damage to coastal structures (Criterion C).**

Alternative 1B

Alternative 1B would result in an ebb bar at the existing location with a volume of approximately 6,500 cy at equilibrium, increased from the existing 3,600 cy. The flood bar would remain substantially larger than the volume of the ebb bar (up to 93,000 cy if there is no inlet maintenance, but approximately 41,000 cy if maintained annually) under Alternative 1B, and the inlet would remain flood dominated, as it is under existing conditions. The project would account for the relatively small increase in nearshore storage needs in the ebb bar through the proposed nearshore and onshore placement of material at Cardiff State Beach. Prenourishing the littoral cell in the vicinity of the site during construction with sufficient sand to offset the total quantities of sand stored in the bars would minimize the effect of the modified inlet conditions on beach conditions and would result in less than significant impacts to beach erosion. As with Alternative 2A, lagoon maintenance activities and placement of that material downcoast would effectively return that sand to the littoral zone. **This bypassing would offset the effects of sand storage in the flood bar and no substantial adverse impacts would occur. There would be less than significant impacts to beach erosion downcoast (Criterion A).**

As discussed under Alternative 2A, sand placement to prenourish the littoral zone within the nearshore and onshore at Cardiff would not change the bathymetry of the bottom substantially enough to modify wave patterns, water currents, or sand transport patterns. **Therefore, no changes to littoral processes from the SELRP are anticipated, and no substantial adverse or significant impacts to the littoral system would occur (Criterion B).**

Sand placement on the beach and in the nearshore is anticipated to result in a wider beach at Cardiff State Beach on a temporary basis. No new coastal structures would be constructed as part of Alternative 1B, and the addition of sand would temporarily provide additional protection to existing coastal structures, such as businesses along Coast Highway 101, including Restaurant Row. The existing inlet would be improved, but remain in place. Scour of bridge piles and abutments would not increase due to the rock sill underlying the existing inlet, which would protect them from scour associated with tsunamis. No changes to wave refraction or inundation by tsunami or seiche would occur within the lagoon. **Temporary beneficial impacts would result with respect to risks of damage to coastal structures (Criterion C).**

Alternative 1A

Alternative 1A would result in an ebb bar with a volume of approximately 3,900 cy at equilibrium, increased from the existing 3,600 cy. The flood bar would remain substantially larger than the volume of the ebb bar (78,000 cy if there is no inlet maintenance, but approximately 33,000 cy if maintained annually) under Alternative 1A, and the inlet would remain flood dominated, as it is under existing conditions. Accretion of sand within the ebb bar is anticipated to be less than 150 cy within the first year. While this amount of sand may be stored within the nearshore as opposed to the beach, it would not be considered a substantial reduction of sand on the beach, and would be more than offset with the first annual maintenance effort to clear out the lagoon, which anticipates placing up to 25,000 cy on the beach. Therefore, the small increase in nearshore storage needs in the ebb bar would be accommodated the first year through the onshore placement of material at Cardiff State Beach as part of inlet maintenance. Effects to beach erosion would be less than significant. Lagoon maintenance activities and placement of that material downcoast would effectively return that sand to the littoral zone. **This bypassing would offset the effects of sand storage in the flood bar and no substantial adverse or significant impact would result to beach erosion downcoast (Criterion A).**

No sand placement within the nearshore would occur under Alternative 1A, and the bathymetry of the bottom would not be changed substantially by the small increase in ebb bar storage to modify wave patterns, water currents, or sand transport patterns. Therefore, no anticipated changes to littoral processes are anticipated from this alternative. **No substantial adverse or significant impacts would occur (Criterion B).**

No sand placement would occur on the beach as part of Alternative 1A construction, and no new coastal structures would be constructed. Existing coastal structures, such as businesses along Coast Highway 101, including Restaurant Row, would not receive additional short-term protection from damage. The existing inlet would be improved but remain in place, and no changes to wave refraction or inundation by tsunami or seiche would occur within the lagoon. Scour of bridge piles and abutments would not increase due to the rock sill underlying the existing inlet, which would protect them from scour associated with tsunamis. **No substantial adverse or significant impacts would result with respect to risks of damage to coastal structures and no benefit would be received (Criterion C).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not change the existing estimated ebb bar volume of approximately 3,600 cy at equilibrium. The flood bar would remain substantially larger than the volume of the ebb bar (63,400 cy if there is no inlet maintenance, but approximately 25,000 cy if maintained annually), and the inlet would remain flood-dominated, as it is under existing conditions. No changes to existing inlet maintenance are anticipated, and annual maintenance of the lagoon inlet is expected to continue to bypass sand by placing approximately 30,000 cy of material on Cardiff State Beach. **There would be no effect on beach conditions and no substantial adverse or significant impacts to beach erosion at the lagoon or downcoast would occur (Criterion A).**

No sand placement within the nearshore would occur under the No Project/No Federal Action Alternative, and the bathymetry of the sea bottom would not be changed. There would be no anticipated changes to littoral processes from the No Project/No Federal Action Alternative, and **no substantial adverse or significant impacts to the littoral system would occur (Criterion B).**

No sand placement or construction of new coastal structures would occur as part of the No Project/No Federal Action Alternative. Existing coastal structures, such as businesses along Coast Highway 101, including Restaurant Row, would not experience additional risks, nor would they obtain beneficial protection from damage. The existing inlet would remain and no changes to wave refraction or inundation by tsunami or seiche would occur. **No substantial adverse or significant impacts would result with respect to risks of damage to coastal structures (Criterion C).**

Materials Disposal/Reuse

Alternative 2A

<u>Offshore Stockpiling</u>

Sand would be placed within the offshore stockpile areas SO-5 and/or SO-6 (previously dredged areas from the SANDAG RBSPs implemented in 2001 and 2012). The stockpiled material would make minor changes to the bathymetry in these previously borrowed areas. Because SO-5 and SO-6 would be located outside of the closure depth they are, by definition, outside of the zone of substantial wave energy impinging on the seabed. As a result, waves would pass over the seabed unattenuated by the moderate bathymetric changes made by sand placement and no substantial changes to wave patterns, currents, or sand transport would occur. SO-5 and SO-6 are located outside of the littoral zone and do not have substantial sand exchange with beaches within the littoral zone. **No substantial adverse impacts would occur to existing littoral processes, including the rate of erosion on beaches within the littoral zone. Impacts would not be substantially adverse and would be less than significant (Criteria A and B).**

Materials placement at offshore sites would occur entirely under water and would not involve the construction of new coastal structures. Changes to littoral processes, waves and currents, or inundation characteristics are not anticipated; therefore, **risks of damage to coastal structures would not be substantially adverse and would be less than significant (Criterion C).**

<u>Nearshore</u>

Nearshore placement adjacent to Cardiff State Beach is a critical component of the proposed project. This material would prenourish the ebb bar to minimize sand erosion on adjacent beaches and is discussed under the lagoon restoration analysis. As analyzed under the lagoon restoration analysis, **no substantial adverse impacts to littoral processes, sand erosion rates, and risk of damage to coastal structures would occur, and impacts would remain less than significant (Criteria A, B, and C).**

<u>Onshore</u>

Materials placement of sand on beaches would temporarily increase widths in the vicinity of placement sites, and sand would then be expected to redistribute as it is influenced by both longshore and cross-shore transport patterns. Predicted changes in shoreline position are shown in Table 3.3-1.

Table 3.3-1
Predicted Changes to Existing Shoreline with Beach Sand Placement

Receiver Site (at widest point in the middle of the fill footprint)	Constructed Beach Width (feet)	Post-Project Beach Widths[1] (in feet)				
		1 Year	2 Years	3 Years	4 Years	5 Years
Leucadia Beach	200	18–15[2]	11	11	11	11
Moonlight Beach	180	38–32	20–18	17–16	16–14	15–14
Cardiff Beach[3]	150	35–31	13–12	0–1	13–9	28–27
Solana Beach	70	24–21	15–14	14	14–13	12–10
Torrey Pines Beach	160	41–36	24–22	20–18	17–15	16–14

Notes:
1. GENESIS modeling results predicting general areas of accretion or erosion rather than site-specific increments of shoreline movement over time.
2. Modeling conducted for both calm and high wave conditions to provide a range of potential erosion/accretion trends. Numbers above reflect predictions for calm wave and high wave conditions, respectively.
3. After 3 years, the disposal/reuse material at Cardiff Beach would be negligible. But maintenance dredging would occur so the beach width increases in Year 4. Maintenance would occur approximately every 3 years so material would be replaced about the same time as it would fully accrete.

Several trends are predicted by the modeling of sand movement. Beach fill placement sites would be discernibly larger after nourishment at each placement site. As time passes, exaggerated bulges at beach placement sites would gradually become less pronounced and appear to extend laterally along the coast. As the fill disperses laterally alongshore, beaches between the fill sites would become wider. As a result, several beaches that are not placement sites may experience long-term widening. This condition is anticipated to occur particularly between sites that are in proximity. Sand is predicted to remain evident in the system for at least 5 years (the definition of “long-term” widening) at multiple locations throughout the North County region.

The SELRP would widen beaches at sand placement sites and certain adjacent beaches for up to 5 years. This widening would add material to the littoral system but would not change transport patterns or erosion rates of sand on those beaches. As noted in Table 3.3-1, beach width at Cardiff is predicted to decrease to preexisting conditions 3 to 4 years after initial implementation of the SELRP. Then, the scheduled maintenance dredging would occur and up to 300,000 cy would be placed at that location. Beach width would increase again resulting in more consistent beach width in that location, which otherwise tends to erode. **Beach sand erosion that could result in long-term beach loss would not occur, and no substantial adverse impacts would occur. Impacts would be less than significant (Criterion A).**

Once it is placed, material would migrate cross-shore as well as along the shore, and sometimes accumulate in the nearshore as additional sand volume or sand bars. This accumulation may affect localized wave characteristics temporarily (e.g., surfing) but would not change the underlying littoral processes that drive sand transport, including regional wave patterns and currents. **No substantial adverse or significant impacts to the littoral system would occur (Criterion B).**

No new permanent coastal structures would be constructed as part of materials placement on area beaches, and the addition of sand would temporarily provide additional protection to existing coastal structures on the beach, as well as bluffs that support coastal structures. **Beneficial impacts would result with respect to risks of damage to coastal structures (Criterion C).**

No direct impacts to the three proximate coastal lagoons would occur from the project. Sand placed from the project has the potential to be transported up and down the coast, then entrained within lagoon inlets. Depending on the volume of material transported, this could lead to more frequent inlet closures and declines in lagoon conditions. Ongoing maintenance programs are implemented at the three subject coastal lagoons to remove excess sediment if it results in inlet closure.

Potential sedimentation to adjacent lagoons due to the project has been predicted based on the method used for the 2012 RBSP (SANDAG 2011); specifically,

- Assumptions of the existing rate of sand capture by the lagoon (portion of the existing gross longshore sediment transport rate),
- Quantity of sand volume placed at a site within the vicinity of the lagoon by the SELRP, and
- Net sand transport direction from that site.

In should be noted that the quantity in the second bulleted item above represents the maximum possible placement of material at each disposal/reuse site, and actual volumes could be less depending on the ultimate configuration of the disposal/reuse scenario. The placement of less material at specific sites would result in a corresponding decrease in sedimentation at lagoon inlets; therefore, the analysis represents a worst-case evaluation.

The SELRP proposes a similar set of materials placement sites and volumes as the 2001 and 2012 RBSPs, with certain exceptions (no fills at Del Mar or anywhere north of Leucadia Beach, and slightly less material at Moonlight Beach). Therefore, conditions experienced at lagoon mouths in proximity to those sites after the 2001 RBSP was constructed could represent trends of the potential effects of the SELRP. Comparison to this prior project in terms of sand volumes and past impact to that lagoon provides a “test-based” perspective for consideration, in combination with the model predictions.

Table 3.3-2 identifies predicted contributions of sand through littoral transport to Batiquitos, San Dieguito, and Los Peñasquitos lagoons and an overview of past history based on the 2001 RBSP. Contributions to adjacent lagoon inlets would be minor and would not result in additional frequency of maintenance compared to historic requirements. **The modeling indicates there would be no significant or substantial adverse impact to these lagoons from placement of SELRP material at onshore sites near these three lagoons (Criterion D).** Reviewing the history from the 2001 RBSP suggests the model predictions are valid.

Alternative 1B

Results for Alternative 1B would be similar to Alternative 2A, but slightly decreased (by 200,000 cy overall, from 1.2 mcy for Alternative 1B to 1.4 mcy for Alternative 2A) for a worst-case scenario. The same offshore, nearshore, and onshore material placement sites are identified for both alternatives, although Alternative 1B would place 200,000 cy less material in the

Table 3.3-2
Potential Sediment Contribution to Lagoons and Comparison to the 2001 RBSP Observations

Coastal Lagoon	SELRP Beach Fill Volumes (cy)	Predicted Effects from SELRP over 6 Years	Impact Conclusion for SELRP[1]	2001 RBSP Beach Fill Volumes at Receiver Sites (cy)	Measurable Effects from 2001 RBSP
Batiquitos	150,000 at Moonlight and 117,000 at Leucadia = 267,000	Minor sedimentation estimated at 9,100 cy total	**No substantial adverse or significant impact**	South Carlsbad 158,000 Batiquitos 118,000 Leucadia 132,000 Moonlight 105,000 = 513,000 total	None
San Dieguito	150,000 at Solana Beach	Minor sedimentation estimated at 4,200 cy total	**No substantial adverse or significant impact**	Solana Beach 146,000 Del Mar 183,000 =329,000 total	Closures increased due to effects from beach fill at the Del Mar receiver site (CFC 2010b)
Los Peñasquitos	245,000 at Torrey Pines	Minor sedimentation estimated at 10,200 cy total	**No substantial adverse or significant impact**	245,000 at Torrey Pines Del Mar 183,000 =428,000 total	Indiscernible, although Los Peñasquitos Lagoon Foundation indicates Del Mar fill was observable (Hastings 2010)

[1] Significance Determination for Criterion D; sand contributions to adjacent lagoon inlets would be minor and would not result in additional frequency of maintenance compared to historic requirements.
cy = cubic yards

nearshore off Cardiff State Beach. Because the placement scenarios are so similar in nature, and no substantial adverse or significant impacts were identified for Alternative 2A, **Alternative 1B is anticipated to also result in less than significant impacts to long-term beach loss, littoral system processes, risks to damage to coastal structures, and coastal wetlands (Criteria A, B, C, and D). No substantial adverse impacts would be anticipated.**

Alternative 1A

As part of Alternative 1A, no sand would be placed within the littoral zone as part of materials disposal/reuse. No changes to SO-5 or SO-6, or the littoral zone would occur.

LA-5

Under Alternative 1A, the only location for off-site materials disposal/reuse would involve disposal of material in LA-5, located outside of the littoral zone approximately 6 miles offshore in relatively deep water. Materials placement within this site would not affect the littoral system, and therefore long-term beach loss, or increase risks of damage to coastal structures. **No substantial adverse or significant impacts would occur to long-term beach loss, littoral system processes, risks to damage to coastal structures, or coastal wetlands due to Alternative 1A (Criteria A, B, C, and D).**

No Project/No Federal Action Alternative

Under the No Project/No Federal Action Alternative, no material would be removed from San Elijo Lagoon or require disposal. Therefore, **no substantial adverse or significant impacts to beach erosion or long-term beach loss, the littoral system, risks of damage to coastal structures, or coastal wetlands would occur (Criteria A, B, C, and D).**

3.3.4 Avoidance, Minimization, and Mitigation Measures

No substantial adverse or significant impacts have been identified; therefore, no mitigation measures are required.

3.3.5 Level of Impact After Mitigation

CEQA: No significant impacts have been identified for coastal processes due to implementation of the SELRP.

NEPA: No substantial adverse impacts would occur to coastal processes due to implementation of the SELRP.

3.4 WATER AND AQUATIC SEDIMENT QUALITY

This section addresses water and aquatic sediment quality based on site visits and various technical studies. Most recent are studies completed by Moffatt & Nichol (M&N) for this restoration effort including the Water Quality Study (M&N 2012b; Appendix E), Sediment Characterization Study (M&N 2010), and SAP (M&N 2013; Appendix A). In addition, monitoring data collected by the SELC (2002)) and MACTEC Engineering (2009) were also evaluated. Water quality within the lagoon during restoration, as well as nearshore and offshore water quality in the ocean during materials disposal/placement activities, is addressed within this section. The aquatic sediment quality analysis addresses the suitability of material for disposal/placement at proposed sites from both a contamination and grain size perspective. To characterize chemical suitability of the project sediments, National Oceanic and Atmospheric Administration (NOAA) numerical sediment quality guidelines (SQGs) for aquatic sediment were used as an informal, interpretive tool, which include two SQG concentrations thresholds:

- “Effects Range-Low” (ERL), where adverse effects were not likely with concentrations below this level; and
- “Effects Range-Median” (ERM), concentrations above which adverse effects were more likely.

The SQGs do not suggest that no effects would occur below the ERL or that adverse effects would occur above the ERM. They are intended to establish statistical guidelines that can be used to rank and prioritize sites of concern and chemicals of concern (NOAA 1999). The SQGs are lengthy and applicable; ERL and ERM for trace metals and organic compounds are contained in technical reports bound separately.

Some discussion provided in this section overlaps slightly with Section 3.2 Hydrology, such as salinity, and references are made to that section where appropriate.

3.4.1 AFFECTED ENVIRONMENT

San Elijo Lagoon Study Area

As discussed in Section 3.2 Hydrology, San Elijo Lagoon is a coastal wetland traversed by various transportation infrastructure, leading to hydraulic inefficiencies, and is affected by urban runoff from a primarily urbanized watershed.

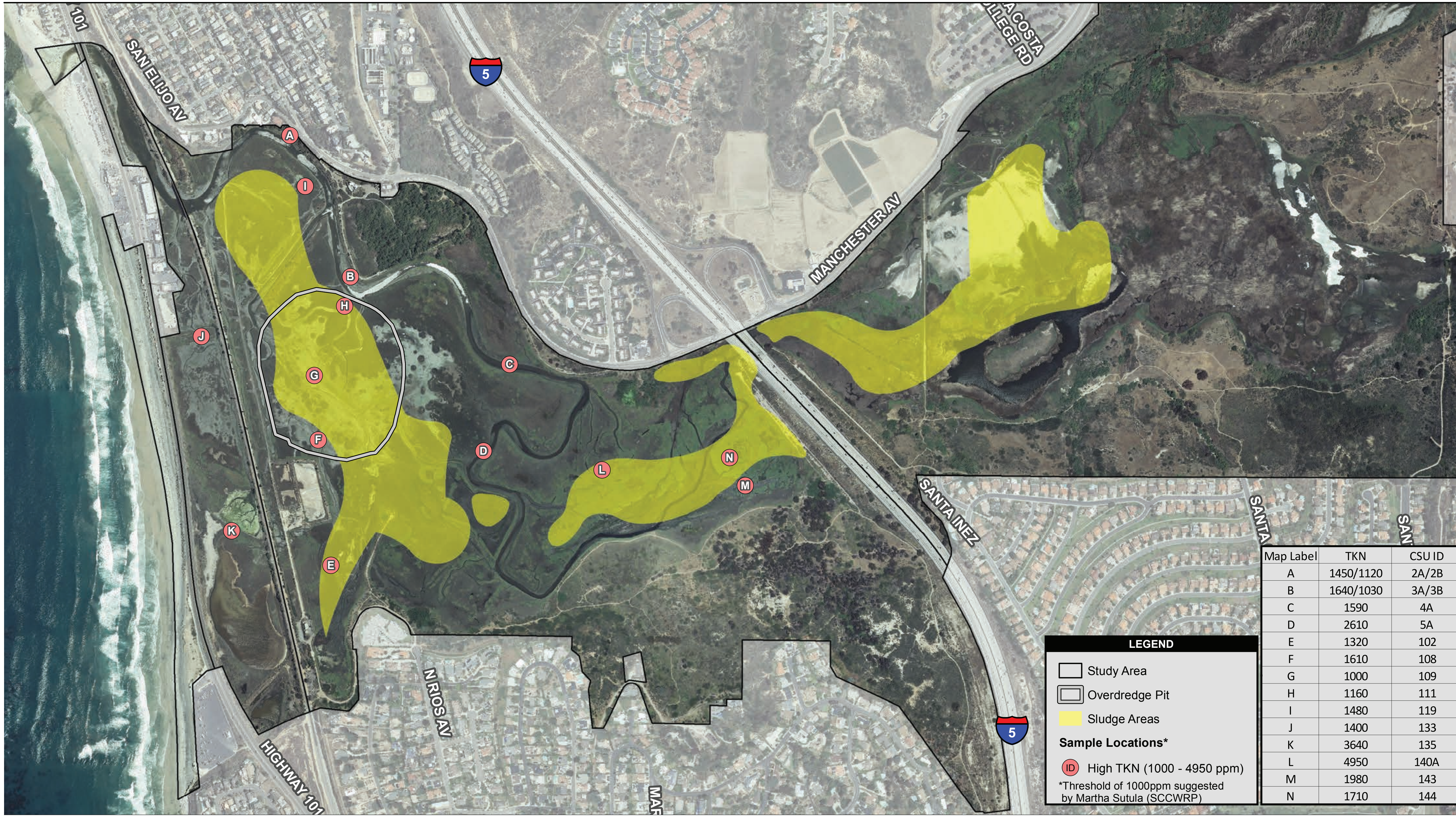
Prior to active management of the lagoon inlet, the mouth of the lagoon was closed much of the year due to the hydraulic inefficiencies of the current channel network and inlet configuration. As a result, tidal exchange has been limited within the lagoon, resulting in the historical accumulation of fine sediments in the east and central basins of the lagoon (USDA 1993) and water quality issues in the lagoon. Although the SELC currently maintains a predominantly open inlet condition, muted tidal flow that occurs even under open inlet conditions contributes to decreased water quality and near-stagnant conditions, particularly in the east basin where flushing is most limited. The manual opening of the tidal inlet conducted by the SELC maintains a degree of tidal flushing; however, poor circulation and water quality issues within the lagoon still exist, particularly if the inlet closes. When the inlet closes, the water column within the lagoon can become eutrophic within a 24-hour period under certain conditions due to the high nutrient load in the historic sediments (McLaughlin 2010).

Much of this high-nutrient sediment lies in “sludge beds” created by past waste discharges into the lagoon, which were mapped in 1966. The same study recorded Total Kjeldahl nitrogen (TKN) of up to 6,200 ppm in the lagoon (Environmental Engineering Lab Inc. 1966). In a 2014 study, researchers found that sediment with TKN values above 1,000 ppm can lead to algal blooms and poor benthic habitat quality (Sutula 2014). A 2002 study conducted on San Elijo Lagoon by California State University Fullerton reexamined TKN levels in the soil and found that high-nutrient soils exceeding the 1,000 ppm threshold can still be found throughout the lagoon, often in areas correlated to the previously mapped “sludge beds” (Laton 2002). These sample locations and their relation to the historic sludge bed are shown in Figure 3.4-1.

Beneficial Uses

The RWQCB defines beneficial uses of water bodies within the San Diego basin in the *Water Quality Control Plan for the San Diego Basin* (Basin Plan) (RWQCB 1994). Beneficial uses form the cornerstone of water quality protection under the Basin Plan. Based on beneficial use designation, water quality objectives are established to help maintain or enhance water quality to support these uses for the long term. Beneficial uses of San Elijo Lagoon are listed in the Basin Plan (RWQCB 1994) and include contact and noncontact water recreation plus support for estuarine, wildlife, and marine habitat. Beneficial uses of the Pacific Ocean within the Carlsbad Hydrologic Unit include recreation and numerous elements to support wildlife and marine habitat, plus navigation and fishing/shellfish harvesting.

Beneficial uses of the San Elijo Groundwater Basin include agricultural supply, industrial service supply and municipal supply (potential) (RWQCB 1994). It should be noted, however, that beneficial uses of the groundwater aquifer west of I-5 are affected by seawater intrusion, which



Map Label	TKN	CSU ID
A	1450/1120	2A/2B
B	1640/1030	3A/3B
C	1590	4A
D	2610	5A
E	1320	102
F	1610	108
G	1000	109
H	1160	111
I	1480	119
J	1400	133
K	3640	135
L	4950	140A
M	1980	143
N	1710	144

Source: UC Fullerton 2002; SANDAG 2012; MoffattNichol; AECOM 2013

750 375 0 750 Feet

Scale: 1:9,000; 1 inch = 750 feet

Figure 3.4-1
Sediment Nutrient Levels

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decreases quality and potential use for the activities described above. Furthermore, previous studies indicate that there is no substantial hydraulic interaction between the deeper groundwater aquifer and the lagoon. Measurable exchange between the lagoon and groundwater is limited to the shallow alluvial aquifer (OMWD 2014). As with the hydrology analysis in Section 3.2 Hydrology, the topic of groundwater is not discussed further.

Water and Sediment Quality Objectives and Criteria

Water quality objectives (WQOs) related to bacteria are shown in Table 3.4-1. The beneficial uses of the lagoon include contact recreation and noncontact recreation. Because the adjacent ocean waters are designated for shellfish harvesting, the most stringent limit applies.

Table 3.4-1
Applicable Water Quality Objectives for Bacteria

Water Quality Objectives	Concentrations			
	Individual Sample	10% of Samples	20% of Samples	Average
Contact Recreation	NA	400/100 ml	NA	200/100 ml
Noncontact Recreation	NA	4,000/100 ml	NA	2,000/100 ml
Bays and Estuaries	10,000/100 ml	NA	1,000/100 ml	1,000/100 ml
Shellfish Harvesting	NA	230/100 ml	NA	70/100 ml

ml = milliliters; NA = not applicable.
Source: RWQCB 1994

The following WQOs also apply to the proposed study area (RWQCB 1994):

- Lagoon dissolved oxygen (DO) levels cannot be less than 5.0 milligrams per liter (mg/L) and the annual mean concentration cannot be less than 7 mg/L more than 10 percent of the time. Ocean waters cannot have DO levels less than 10 percent from the normal.
- Changes in normal ambient pH levels cannot exceed 0.2 units in the lagoon.
- Oil and grease cannot be visibly present on surface waters.
- Pesticides cannot be present in the water column, sediments, or biota at concentrations that adversely affect beneficial uses or human health, wildlife, or aquatic organisms.
- Radionuclides cannot be present in concentrations that are deleterious to human, plant, animal, or aquatic life and cannot result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

- The suspended sediment load and suspended sediment discharge rate of surface waters cannot be altered in a manner that would cause nuisance or adversely affect beneficial uses.
- Waters cannot contain suspended and settleable solids that cause nuisance or adversely affect beneficial uses.
- The natural temperature of a receiving water body cannot be altered unless the alteration can be shown to not adversely impact beneficial uses.

The Basin Plan also states that water should be maintained free of toxic substances in concentrations that are toxic to, or produce negative physiological responses in, human, plant, animal, or aquatic life. A list of toxic substances and their numerical limits is provided in 40 CFR 131.36, which includes polychlorinated biphenyls (PCBs) and the pesticides DDT, DDE, and DDD.

According to the CWA Section 303(d) list of impaired water bodies, San Elijo Lagoon is listed as being impaired (or polluted) by eutrophic conditions (oversaturated nutrients), indicator bacteria, and sedimentation/siltation (SWRCB 2011). These conditions have originated from unspecified point and nonpoint sources (e.g., pipe discharges and runoff, respectively). The Pacific Ocean shoreline near the mouth of the lagoon is listed for total coliform bacteria.

Salinity

Salinity levels in San Elijo Lagoon can fluctuate during storm events, with levels ranging from an ocean salinity concentration of 34 parts per thousand (ppt) to freshwater conditions of less than 5 ppt. These fluctuations and the resulting low salinity conditions in the lagoon can impact salt marsh habitats that typically depend on higher salinity levels. According to the Water Quality Study (M&N 2012b), the east basin can completely fill with freshwater during a storm event and freshwater conditions can remain for approximately 1 week following the storm. This is due to poor water circulation and drainage out of the lagoon caused by flow constrictions at the I-5 bridge and the tidal inlet at Coast Highway 101. The central basin can also fill with freshwater during a storm event; however, the western portion of the basin is closer to the ocean and experiences greater tidal influence, receiving regular mixing between ocean and freshwater during incoming and outgoing tides. The west basin, closest to the tidal inlet, experiences the greatest tidal influence and maintains higher salinity levels during and after storm events due to limited circulation within the basin. Overall, salinity levels in the lagoon depend on efficient tidal exchange, with better circulation resulting in more rapid salinity recovery.

Based on a 24-hour SELC salinity study in 2002 (SELC 2002) with freshwater urban runoff input, salinity is less stratified at stations near the ocean inlet and more stratified upstream near the I-5 bridge. The study revealed the following:

- Salinity of the freshwater input to the lagoon's east basin (through the culvert in the CDFW dike) was consistently 1.2 ppt at the surface and bottom of the water column.
- Average salinity in the lagoon was approximately 15 ppt.
- Salinity in the offshore area and the ocean boundary was 34 ppt.

Nutrients

Excessive concentrations of nutrients such as nitrogen and phosphorus can lead to algal blooms that in turn promote eutrophication and hypoxia (depressed DO) that can stress aquatic organisms and cause unpleasant odors. The WQOs set by the Basin Plan (RWQCB 1994) are 0.025 mg/L for ammonia and an allowable exceedance of 10 percent for nitrite and nitrate (N+N), total nitrogen (TN), and total phosphorus (TP). Chlorophyll 'a' has a water quality related benchmark of 20 micrograms per liter (μg/L).

A 2009 study was conducted to measure nutrients in and around the lagoon at the following locations (MACTEC 2009):

- Segment 1 of the lagoon near the I-5 overpass
- Segment 2 near the visitor's center
- Lagoon inlet
- Escondido Creek at the Camino del Norte Bridge mass emission station

At the Escondido Creek mass emission site upstream from the lagoon, monitoring results indicate the following:

- TN, TP, and ammonia for both dry and wet weather conditions exceeded their respective WQOs for nutrients/eutrophication.
- The mean concentration of chlorophyll 'a' during the dry period did not exceed the benchmark; chlorophyll-a was not analyzed during storm events.
- N+N concentrations did not exceed the WQO in any sample.

At the lagoon sites, monitoring results indicate that:

- The mean ammonia concentration exceeded the WQO under both wet and dry weather conditions. Mean concentrations during wet weather were 0.04 mg/L at all three lagoon sampling sites. During dry weather, mean concentrations were 0.12 mg/L at Segment 1 and 0.05 mg/L at both Segment 2 and the lagoon inlet. In total, during dry weather, 90 percent and 55 percent of samples exceeded the WQO at Segments 1 and 2 and the lagoon inlet, respectively.
- The mean concentration of chlorophyll 'a' did not exceed the benchmark during wet weather. Mean concentrations were 17.8 µg/L at Segment 1, 13.7 µg/L at Segment 2, and 11.2 µg/L at the lagoon inlet. The mean concentration of chlorophyll 'a' did not exceed the benchmark at Segment 1 or the lagoon inlet during dry weather, with mean concentrations of 16.9 µg/L and 10.2 µg/L, respectively. However, the mean concentration exceeded the benchmark at Segment 2 during dry weather with a concentration of 31.5 µg/L. Of the samples in total from all three lagoon sampling sites, 17 percent exceeded the benchmark during dry weather.
- Zero percent of N+N samples exceeded the WQO under both wet and dry weather conditions.
- Between 13 to 83 percent of samples at the three sampling stations under both wet and dry weather conditions exceeded the WQO for TN. During wet weather, 83 percent of samples exceeded at Segment 1, and 33 percent exceeded at Segment 2 and the lagoon inlet. During dry weather, 58 percent of samples exceeded at Segment 1; 27 percent exceeded at Segment 2, and 13 percent exceeded at the lagoon inlet.
- Between 27 to 100 percent of samples at each site under both weather conditions exceeded the WQO for TP. During wet weather, 100 percent of samples exceeded at all three lagoon sampling sites. During dry weather, 92 percent exceeded at Segment 1; 54 percent exceeded at Segment 2, and 27 percent exceeded at the lagoon inlet.

The mean concentrations of these constituents were, with some exceptions, only slightly greater than WQOs. In some instances, the mean concentration was lower than the WQO, but several samples that exceeded the WQO resulted in an exceedance rate that was slightly greater than the 10 percent allowable exceedance frequency. Additionally, concentrations for TN and TP in San Elijo Lagoon were below historical concentrations (M&N 2012b).

Nutrient levels affect the DO levels in the water column, which are an important parameter for sustaining aquatic life. High nutrient levels can cause algae growth; algae can affect DO by releasing oxygen during the day, and by respiring and pulling DO out of the water column at night, thus lowering DO levels. Studies within the lagoon have shown that historically accumulated nutrients in the sediment are one of the primary causes of eutrophication and low DO levels in the water column (McLaughlin et al. 2010). Algae are also a sign of poor circulation and potentially compromised water quality for organisms. San Elijo Lagoon had a DO level that fell below the single sample minimum concentration (5 mg/L) between 30 and 50 percent of the time. Most of the DO concentrations that fell below the single-sample minimum occurred during the summer and fall (M&N 2012b).

Coliform Bacteria

Bacteria can be harmful to the health of organisms and humans. For indicator bacteria, including coliform and *Enterococcus*, MACTEC monitoring results indicate:

- For wet weather conditions, all three indicator bacteria (fecal and total coliform and *Enterococcus*) concentrations at the mass emission station (Camino del Norte Bridge) exceeded Assembly Bill (AB) 411 water quality standards for body contact. Bacteria results within the lagoon also exceeded the standard during the wet weather conditions, although the concentrations are lower than those at the mass emission site.
- For dry weather conditions, *Enterococcus* concentrations exceeded the AB 411 standard at both the mass emission station and lagoon sites, fecal coliform exceeded the standard at the mass emission station and Segment 1 downstream of I-5 Bridge, and there were no exceedances for total coliform. Dry weather periods do not generally appear associated with beneficial use impairments from bacteria for San Elijo Lagoon.

Wet weather water samples had higher bacterial concentrations than dry weather samples, suggesting that nonpoint sources are the primary contributors to elevated bacteria concentrations and annual loadings to the lagoon. Also, as wet weather flows contribute between 84 and 98 percent of the total annual flow volume, nearly all of the bacteria loadings into the lagoon are during wet weather storm events. Within the lagoon, concentrations during the winter were the highest. The highest exceedance frequencies were associated with *Enterococcus* and fecal coliform (M&N 2012b).

Sediment

Sediment can also degrade water quality if present in sufficient concentrations. The lagoon is listed as impaired for sedimentation/siltation. Sediment in the water column is referred to as total suspended solids (TSS), which can indicate available solids that are in suspension that can deposit in the lagoon (or elsewhere) when water conditions are suitable (i.e., slower velocities).

In 2009, TSS was measured during both wet and dry weather at San Elijo Lagoon (MACTEC 2009). At the inflow measurement point in Escondido Creek (mass emission site), TSS mean concentrations were highest during high flow wet weather conditions. During winter dry weather conditions, the mean concentrations were the lowest of all periods of the year. Spring season TSS mean concentrations were higher than TSS mean concentrations during other seasons (M&N 2012b).

Wet weather samples from Escondido Creek were also analyzed for grain size distribution. More than 80 percent of the samples had silt/clay grain sizes (M&N 2012b). Smaller suspended particles (<10 microns [µm]) generally remain suspended in the water column and do not settle out as fast, as opposed to larger suspended particles that settle fairly quickly. Sediment in the lagoon from upstream sources is predominantly fine material.

At the lagoon sites, TSS concentrations did not appear to correlate to particular sample times during any of the three monitored events. TSS mean concentrations at the lagoon sites are greater than that of the mass emission station farther upstream during dry weather conditions (M&N 2012b). Sediment near the lagoon inlet is a result of flood shoaling from tidal waters. The flood shoal constricts the inlet and prevents further tidal intrusion and flushing.

A chemical analysis of sediments in San Elijo Lagoon has been conducted in accordance with the ITM as discussed in the SAP (M&N 2013; Appendix A). A total of 55 subsurface explorations (borings) were performed in the east, central, and west basins. The borings took samples from upper and lower layers of sediments and were characterized by shallow and deep borings. Boring depths were located based on the proposed depth of cut in the area being sampled. Shallow borings extended approximately 8 feet below ground surface (bgs) and deep borings extended to a depth of 30 feet bgs. The chemical analysis showed that most of the tested analytes fell below their respective ERLs. The analytes that met or exceeded their ERL and/or ERM are shown in Table 3.4-2.

Only the concentration for DDT in the upper layer of the overdredge pit location in the central basin exceeded its ERM. This material would not be used for the materials reuse component of the proposed project, but would be disposed of off-site at LA-5 (Alternative 1A) or on-site in the overdredge pit created in the central basin (Alternative 2A and Alternative 1B). Following on-site placement of this material, the overdredge pit would be capped by sand material removed from the proposed inlet location, which would encapsulate the material and prevent it from being introduced in the water column or released into the environment (M&N 2013).

Table 3.4-2
Sediment Contaminant Concentrations (M&N 2013)

Area of Lagoon	Sample Composite ID	Contaminant	ERL (µg/kg)	ERM (µg/kg)	Sample Concentration (µg/kg)
West Basin	WB-COMP-SB-Upper	4,4'-DDE	2.2	27	2.2
Central Basin	CB-COMP-South-Upper	4,4'-DDE	2.2	27	6.5
Central Basin	CB-COMP-NW-Upper	4,4'-DDE	2.2	27	3.1
Central Basin	CB-COMP-NW-Upper	4,4'-DDD	2.0	20	2.8
East Basin	EB-COMP-North-Upper	Aroclor PCBs	22.7	180	39
East Basin	EB-COMP-South-Lower	Aroclor PCBs	22.7	180	92
Overdredge Pit	WB/CB-COMP-D-Upper	4,4'-DDD	2	20	3.9
Overdredge Pit	WB/CB-COMP-D-Upper	4,4'-DDE	2.2	27	5.7
Overdredge Pit	**WB/CB-COMP-D-Upper**	**4,4'-DDT**	**1**	**7**	**12.6**

µk/kg = micrograms per kilogram

Materials Disposal/Reuse Locations

Areas available for materials disposal/reuse are located on-site, and at onshore, nearshore, or offshore sites (Figure 1-3). Water quality for ocean waters tends to be more homogenous than fluvial waters due to the dilution effect of the ocean.

Beneficial Uses

Beneficial uses for the Pacific Ocean are broad (RWQCB 1994) and include contact and noncontact water recreation, commercial and sport fishing, preservation of biological habitats of special interest, spawning, reproduction and early development, and shellfish harvesting.

Water Quality Objectives

Both the SWRCB and the California Department of Public Health (DPH) have established standards to protect water contact recreation in coastal waters from bacterial contamination. The SWRCB and DPH water contact bacterial objectives are as follows (SWRCB 2012):

- 30-day Geometric Mean
  - Total coliform shall not exceed 1,000 per 100 milliliters (ml);
  - Fecal coliform density shall not exceed 200 per 100 ml; and
  - *Enterococcus* density shall not exceed 35 per 100 ml.
- Single Sample Maximum
  - Total coliform density shall not exceed 10,000 per 100 ml;
  - Fecal coliform density shall not exceed 400 per 100 ml;

  - *Enterococcus* density shall not exceed 104 per 100 ml; and
  - Total coliform density shall not exceed 1,000 per 100 ml when the fecal coliform/total coliform ratio exceeds 0.1.

The Water Quality Control Plan for Ocean Waters of California (Ocean Plan) (SWRCB 2012) outlines the following narrative WQO for the physical characteristics of ocean waters in California:

- No floating particulates and grease and oil can be visible.
- The discharge of waste cannot cause aesthetically undesirable discoloration of the ocean surface.
- Natural light cannot be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.
- The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments cannot be changed such that benthic communities are degraded.

The Ocean Plan (SWRCB 2012) outlines the following narrative WQO for the chemical characteristics of ocean waters in California:

- DO concentration cannot be depressed more than 10 percent from that which occurs naturally from the discharge waste materials.
- The pH cannot be changed more than 0.2 units from that which occurs naturally.
- Dissolved sulfide concentration of waters in and near sediments cannot be significantly increased above that present under natural conditions.
- The concentration of substances in Chapter II, Table B, in marine sediments cannot degrade indigenous biota.
- The concentration of organic materials in marine sediments cannot degrade marine life.
- Nutrient materials cannot cause objectionable aquatic growths or degrade indigenous biota.

The quantitative WQOs for chemical constituents can be found in Table B of the Ocean Plan (SWRCB 2012).

As noted in the introduction of this section, NOAA uses numerical ERL and ERM SQGs for aquatic sediment as concentrations that can be used to rank and prioritize sites of concern and chemicals of concern.

Areas of Special Biological Significance

Two Areas of Special Biological Significance (ASBS) sites are in the vicinity of the project: the La Jolla ASBS #29 and the Scripps ASBS #31. In 1983, the SWRCB Ocean Plan officially prohibited polluted runoff and discharges into an ASBS by requiring that runoff and discharge sources be located a sufficient distance to maintain natural water quality conditions. Stormwater runoff and coastal river discharges can cause large turbidity plumes and reduce near-surface salinity up to several miles, while adding suspended sediments, nutrients, bacteria/pathogens, and chemical contaminants to nearshore waters during storm events. The Torrey Pines materials disposal/reuse site is approximately 2 miles north of the Scripps ASBS and the La Jolla ASBS is farther.

Physical Parameters

During late spring through fall, solar heating of the ocean surface creates temperature gradients in the water column (thermocline) that induce correlating density gradients (pycnocline), which can restrict vertical mixing of most water quality parameters (SANDAG 2011). During winter and early spring, thermoclines are weakest in response to reduced insolation (solar heating) and increased mixing from winter storm activity and upwelling of deeper ocean waters.

Seasonal upwelling and downwelling affect marine water quality along the San Diego coast. Upwelling is initiated when wind patterns displace surface waters offshore, resulting in an upward replacement of colder, deeper waters with lower DO concentrations, and higher salinity and nutrient concentrations. Upwelling is generally present from late March through July in the San Diego County area. Downwelling occurs when wind forces surface water onshore and forces it downward, causing warmer temperature and lower salinity in deeper waters.

Temperature

Surface water temperature along the coast of San Diego varies seasonally with solar heating, upwelling, and climatic conditions, ranging from approximately 53.6 degrees Fahrenheit (°F) in winter to 69.8°F in summer. Temperatures of bottom waters in the project area range from approximately 48.2°F to 60.8°F. Waters are stratified during the summer and early fall, unstratified during the winter, and transitional (e.g., stratification weakening or increasing) in late fall and spring.

Salinity

Salinity in nearshore portions of the Southern California Bight is fairly uniform, ranging from approximately 32 to 34 ppt. Salinity tends to be homogenous throughout the water column, with differences between the surface and the bottom typically less than 1 ppt. Some seasonal and/or spatial differences in salinity may reflect upwelling of denser, more saline bottom waters or discharges of freshwater runoff from coastal wetlands and creeks (SANDAG 2011).

pH

Typical pH values for nearshore coastal waters range from 7.7 to 8.4. Slightly higher pH values may occur during May through September when water temperatures are warmer. Depth-related changes in pH typically are minimal.

Sediment/Turbidity

The clarity of nearshore coastal waters is dependent on localized and temporal changes induced by coastal river and lagoon discharges (normal tidal exchange and/or urban/stormwater runoff), and plankton blooms. Waters may be more turbid in the winter due to greater wave energy, surface runoff, and river discharges, although seasonal patterns are also subject to considerable variation in storm magnitude and duration. Runoff-related discharges and associated natural turbidity tend to occur in pulses rather than as continual discharges or consistent seasonal inputs. Water clarity in spring and summer also may reflect plankton blooms (e.g., red tides) and suspended particles concentrating near the thermocline.

Rip currents also influence nearshore turbidity by transporting higher turbidity water beyond the surf zone. TSS concentrations of more than 1,000 mg/L were measured in rip currents off Imperial Beach (SANDAG 2011). Generally, rip currents are more pronounced during high wave conditions associated with higher tides, high winds, and/or storm swells. In general, water clarity and light transmittance tend to increase with distance from shore.

Similar to transmissivity values, TSS concentrations typically are relatively lower offshore than nearshore. TSS concentrations ranged from <1 to 47 mg/L offshore of Carlsbad over a 13-year monitoring period, with highest concentrations recorded after storm events or occasionally in the summer (probably due to phytoplankton blooms) (SANDAG 2011).

Turbidity levels may be substantially higher near the mouths of coastal lagoons due to river discharges, storm runoff, and/or algal blooms. TSS concentrations of 100 mg/L were recorded just inside Batiquitos Lagoon at the same time that concentrations of 20 mg/L were recorded in the adjacent nearshore zone during a non-storm period (SANDAG 2011).

Nutrients

Nutrient concentrations for coastal waters typically are higher near the bottom than near the surface, except during upwelling periods. Nearshore nutrient concentrations may be elevated in areas of wastewater discharge and near the outlet of rivers, lagoons, bays, and harbors. Nitrate levels in nearshore surface waters may vary from 0.1 mg/L to >8 mg/L during upwelling, and phosphate levels may range from 0.5 to 0.8 mg/L (SANDAG 2011).

Contaminants

The quality of nearshore ocean water within the project area is generally good, and water quality parameters are within Basin Plan limits. However, conditions in some areas are affected by local stormwater runoff discharges. In general, bacterial levels along the beaches in San Diego County are elevated occasionally by stormwater runoff.

3.4.2 CEQA Thresholds of Significance

A significant impact related to water and aquatic sediment quality would occur if implementation of the SELRP would result in:

A. Changes in hydrological conditions causing sedimentation in downstream areas and/or alterations in circulation patterns that substantially inhibit vertical mixing of water or promote stagnation (lagoon restoration only);

B. Pollutants generated or released to the environment in violation of applicable federal or state standards, hazardous to human health, or deleterious to biological communities; or

C. Disposal of dredged sediments/excavated soils that would cause substantial adverse changes to water or sediment quality, toxicity or bioaccumulation of contaminants in aquatic biota, or declines in wildlife habitat (materials disposal/reuse only).

The CEQA thresholds of significance for water and aquatic sediment quality were derived from thresholds used in the EIR/EIS for the San Dieguito Wetland Restoration Project (SCH #98061010). These thresholds were utilized because County guidance documents do not specifically address water quality issues unique to coastal restoration. Thresholds associated with currently listed 303(d) water bodies, which indicate impaired waters pursuant to the San Diego

Basin Plan, and with sediment removal/dredging were developed because these issues are not addressed in County thresholds but have the potential to impact water quality.

3.4.3 ENVIRONMENTAL CONSEQUENCES

This section discusses the environmental consequences, or impacts, associated with the proposed project related to water and aquatic sediment quality. Potential adverse, significant, or beneficial direct and indirect impacts are identified as appropriate.

Lagoon Restoration

Alternative 2A

Temporary

There is the potential for temporary water quality impacts to occur during construction activities, including dredging. Construction activities associated with Alternative 2A have the potential to impact water quality through the release of pollutants such as sediment, soil stabilization residues, oil and grease, and trash and debris. Soil disturbance would expose soil to erosion from wind and water that could also result in sedimentation to receiving surface waters. Temporary construction activities could cause significant adverse impacts to water or sediment quality. The project would be required to comply with applicable regulations (e.g., Municipal Permit, Construction General Permit) to minimize pollutant transport during construction activities. As discussed in Section 3.2 Hydrology, the Construction General Permit requires the development of a project SWPPP identifying BMPs that would be used to protect water quality, minimize erosion and pollutant discharge, and avoid sediment transport during construction (PDF-25). Through development and implementation of the SWPPP, BMPs would provide protection of lagoon waters. BMPs, such as silt curtains, flocculants, and jute netting, would be implemented during dredging to control turbidity and sedimentation within the water column. Erosion- and sediment-control BMPs such as fiber rolls, silt fences, gravel bag barriers, hydraulic mulch, soil binders, and stabilized access roads and construction entrances would also be implemented during construction activities to minimize sediment disturbance and erosion potential. In addition, as discussed in Section 2.10, several construction methods would be employed that would minimize water quality impacts. For instance, actively managing water levels by temporarily diking off portions of the lagoon being actively dredged would help to prevent release of disturbed sediment to the coast (PDF-27). This strategy would control the flow of turbid, disturbed waters and allow for some settling of sediment and other potential pollutants. A cutterhead suction dredge would be used, which would avoid/minimize the generation of turbidity at the location of the dredge (PDF-27). In addition, following on-site placement of the overdredge material, the overdredge pit would be capped by sand material removed from the proposed inlet location, which would encapsulate the material and prevent it from being introduced in the water column or released into the environment (M&N 2013) to help minimize sedimentation and turbidity impacts and the potential release of contaminants (PDF-28).

Although turbidity within the lagoon would be expected during active construction (e.g., during temporary flooding and dredging), the generation of turbidity would be minimized through the construction approach proposed for the project, as described above. Localized turbidity could occur during the placement of fine material at the overdredge pit during construction phases 2, 3, and 4, or when flow is released into the ocean. Nutrients could potentially become suspended within these areas of localized turbidity, temporarily increasing the potential for eutrophic conditions to develop within the lagoon. Outside of the lagoon inlet, the nearshore area is shallow and naturally turbid due to wave and wind action; turbidity would dissipate quickly from mixing and dilution. **However, because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/siltation, the temporary turbidity that would be generated by lagoon restoration activities, most specifically the dredging operations, would be considered a potentially significant impact under CEQA (Criterion A). No substantial adverse impacts would occur under NEPA due to PDFs and regulatory requirements that would be met.**

The vertical (depth-related) extent of plumes depends on the initial displacement of bottom sediments, physical characteristics and settling velocities of the sediment particles, and vertical mixing characteristics of the water column. For example, the vertical distribution of sand-sized particles disturbed by a cutterhead dredge may be confined to the near-bottom water layer once it is discharged from the dredge pipe, particularly when the bottom sediments consist of coarse-grained, rapid-settling particles and a natural density gradient is present in the water column that limits vertical mixing. In contrast, disturbed fine-grained sediments may remain suspended and distributed throughout the water column for long periods, particularly during winter (unstratified) conditions. The estimated plume distance on any given day would vary according to the grain size characteristics of the material, turbulence, current speed, and to what depth in the water column the particles are resuspended.

There is also the potential for temporary sediment quality impacts to occur as a result of the release of pollutants (e.g., oil and grease, nutrients, pesticides, PCBs, metals) from dredging, which could adhere to lagoon sediments. Based on the SAP (Appendix A), as discussed above, the majority of pollutants analyzed were below their respective ERLs. Only the DDT concentration in the upper layer of sediment of the overdredge pit location in the central basin exceeded its ERM. Implementation of BMPs to protect water quality by controlling pollutant discharge from land-based construction areas (e.g., spill prevention and control, stockpile management) would reduce/minimize potential impacts to sediment quality during construction activities. In addition, pollutant release associated with localized temporary turbidity caused by dredge equipment would be minimized through implementation of aquatic-based BMPs (e.g., flocculants, silt curtains in tributary channels). As a result of BMP implementation required in compliance with the General Permit and the County MS4 Permit, as well as any additional specific conditions that would be identified as part of the 401 permit process with the RWQCB to address 303(d) impairments, temporary construction activities are not anticipated to impact sediment quality beyond existing conditions.

As discussed in Section 3.2 (Hydrology), the Construction General Permit requires the development of a project SWPPP that identifies BMPs that would be used to prevent pollutant discharge. In addition, a SWMP would be prepared in compliance with the County MS4 Permit (PDF-25), and specific BMPs may also be incorporated as conditions of the 401 permit process with the RWQCB. Per the County MS4 Permit, storm water discharges from the site would not be allowed to contain sediments that differ in composition or in amounts in excess of the sediments that would have been discharged from the site in an undisturbed condition. Through implementation of the SWPPP, SELC would provide protection of the grading perimeter and environmentally sensitive areas. Protection would be accomplished through use of such BMPs as filtration devices, silt fencing, fiber rolls, gravel bag barriers and check dams, and/or gravel inlet filters. Capture of sediment and dust would be accomplished through use of storm-drain inlet protection and construction access road stabilization. Sediment movement would be minimized from unpaved to paved areas by limiting access into/out of dirt areas; implementing stabilized construction entrances (coarse gravel, steel shaker plates, etc.); and installing fiber rolls, silt fences, or other devices approved under the County permit. In addition, since San Elijo Lagoon is listed as impaired by eutrophic conditions, indicator bacteria, and sedimentation/siltation (CWA Section 303[d]), specific BMPs may also be incorporated as conditions of the 401 permit process with the RWQCB to target construction-related sources of nutrients and bacteria, while also minimizing the effects of sediment disturbance (e.g., erosion). See Table 3.4-3 for typical BMP types that would be used during construction activities.

Table 3.4-3
Potential Construction-Phase BMPs

Type of BMP	Description and Purpose
Turbidity Control	
Flocculant	Promotes the coagulation of suspended particles to induce settling and decrease turbidity. Nontoxic polyacrylamide flocculants would be based on site-specific lagoon soil and water samples to maximize effectiveness. Application would be as close to the area of disturbance as possible. Flocculant would be used in tandem or combination with other BMPs presented in this table.
Jute Netting	Captures suspended sediments in the water column when used in conjunction with flocculant polymers to enhance coagulation of suspended particles directly on webbing. Jute netting is an organic product.

Type of BMP	Description and Purpose
Temporary Dikes	Help to minimize the impact of dredge-related turbidity within a localized work area. Implementation would depend on contractor preference. Used for short-term control as tidal conditions allow.
Silt Curtains	Allow suspended sediment to settle out of the water column in a controlled area, to minimize the area affected by potential increased suspended sediment within the water column. Silt curtains are an impermeable barrier constructed of a flexible reinforced thermoplastic material. Provides similar temporary turbidity control where tidal surge is minimal. If used, they would likely be most effective in smaller tributary channels far from the lagoon mouth (i.e., higher in the watershed).
Filtration Device (gunderbooms)	Allows water to flow through the curtain while filtering suspended dredged sediment from the flow. Gunderbooms extend from the water surface to the bottom. Gunderbooms are permeable geotextile fabrics.
Sediment Control	
Silt Fence	Detains sediment-laden water, promoting sedimentation behind the fence. Suitable for use at edge of disturbance areas; around temporary stockpiles; along the perimeter of a site; below areas where sheet flows discharge from the site; below the toe or downslope of exposed and erodible slopes.
Fiber Rolls	Intercept runoff, reduce flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). Suitable for use along the perimeter of a site; downslope of exposed soil areas; around temporary stockpiles.
Gravel Bag Berm/Sand Bag/Straw Bale Barrier	Intercepts and ponds sheet flow runoff, allowing sediment to settle out. Suitable for use along the perimeter of a site; below the toe of slopes and erodible slopes; downslope of exposed soil areas; around temporary stockpiles; at the top of slopes to divert runoff away from disturbed slopes.
Biofilter Bags	Detain flow and allow a slow rate of discharge through the wood media; remove suspended sediment through gravity settling of the detained water and filtration within the bag. Suitable for use along the perimeter of disturbed sites; around temporary stockpiles; below the toe of slopes and erodible slopes; downslope of exposed soil areas.
Erosion Control	
Hydraulic Mulch	Sprayed onto soil surface to provide a layer of temporary protection from wind and water erosion. Suitable for disturbed areas that require temporary stabilization to minimize erosion or prevent sediment discharges until permanent vegetation is established. Can be applied in combination with seeding/planting efforts.
Soil Binders	Soil stabilizer applied to the soil surface to temporarily prevent water- and wind-induced erosion of exposed soils. Suitable for disturbed areas requiring temporary erosion and sedimentation protection until permanent vegetation is established. Can be applied in combination with seeding/planting efforts.
Straw/Wood Mulch	Reduces erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff. Suitable for disturbed areas requiring temporary erosion and sedimentation protection until permanent vegetation is established. Can be applied in combination with seeding/planting efforts.
Hydroseeding	Seed applied to soil surface to temporarily protect exposed soils from water and wind erosion. Suitable for disturbed areas requiring temporary erosion and sedimentation protection until permanent vegetation is established. Can be used to apply permanent stabilization. Hydraulic seed should be applied with hydraulic/straw mulch for adequate erosion control.
Materials Management	
Spill Prevention and Control	Prevent or reduce the discharge of pollutants to watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, and properly disposing of spill materials. Cover and berm outdoor storage/equipment areas, store spill cleanup materials in clearly marked locations, and clean spills immediately. Suitable for pollutants including sediment, nutrients, trash, metals, and oil and grease.
Stockpile Management	Reduce stormwater pollution from stockpiles by locating stockpiles as far away as possible from stormwater flows, watercourses, and inlets, and covering stockpiles. Protect stockpiles from stormwater runon using temporary perimeter sediment barriers such as silt fences, fiber rolls, sandbags, gravel bags, or biofilter bags.

Type of BMP	Description and Purpose
Solid Waste Management	Prevent or reduce the discharge of pollutants from solid waste by providing waste collection areas and an adequate number of containers, arranging for regular disposal, collecting site trash daily, and cleaning up spills immediately. Suitable for construction and domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes. Targeted pollutants include sediment, nutrients, bacteria, trash, oil and grease, and metals.
Housekeeping Practices	Maintain clean and orderly work sites; dispose of wash water, sweepings, and sediments properly; recycle or dispose of fluids properly; and train contractors in BMPs and pollution prevention. Targeted pollutants include sediment, nutrients, bacteria, trash, oil and grease, and metals.

In addition, with the required implementation of construction BMPs identified in the project SWPPP aimed at preventing or minimizing sediment and pollutant discharge, temporary impacts to additional parameters, including temperature, salinity, and pH, are not anticipated to occur. As part of compliance with the Municipal Permit, the project SWPPP, and Section 401 water quality certification required from the RWQCB, water quality would be protected and monitoring would be conducted to verify that water quality standards are met (PDF-53). As discussed in Section 3.15 Hazardous Materials and Public Safety, a sediment management plan would be implemented to verify that sediments being transported and deposited are not in violation of applicable federal or state standards, hazardous to human health, deleterious to biological communities, or cause substantial adverse changes to water or sediment quality (HAZ-3).

Temporary diking and inundation of specific areas during phased construction of Alternative 2A could lead to changes in circulation that promote stagnation or reduce vertical mixing of water within the lagoon. However, the lagoon is currently densely vegetated and has obstructions to flow (e.g., CDFW dike) that inhibit circulation and contribute to stagnant water conditions. During construction, localized circulation would increase for a number of reasons. As flooding is initiated and vegetation removed from the basins, the water elevation would increase and surface area would expand. The fetch across impounded areas would increase, promoting circulation and turnover. In addition, some increases in localized circulation would occur due to dredge and support equipment movement and wind wave-driven circulation. Increased erosion and downstream sedimentation would not be anticipated during construction activities as inundated areas would be subject to slower velocities as they are generally separated from inlet flows. As construction progresses and impounded areas are released and opened to tidal action, those areas would have less vegetation and greater tidal exchange, increasing circulation, mixing, and turnover compared to existing conditions.

As described above, a number of BMPs would be required in order to protect water quality and minimize turbidity and pollutant discharge in compliance with existing regulations (e.g., Construction General Permit, Municipal Permit). In addition, the construction approach employed for the project would minimize water quality impacts, including the use of a cutterhead suction dredge to minimize the generation of turbidity during dredging and the use of temporary dikes during dredging to prevent release of disturbed sediment. With implementation of the construction methods and BMPs, pollutants would not be generated or released to the environment that are in violation of applicable federal or state standards, hazardous to human health, or deleterious to biological communities. Changes in hydrologic conditions during construction would not cause sedimentation in downstream areas or result in alterations in circulation that would inhibit vertical mixing or promote stagnation.

With a combination of physical and regulatory measures, Alternative 2A would result in less than significant temporary impacts from target pollutants generated or released to 303(d) waters (Criteria A and B), with the exception of the impact related to turbidity. As described above, since the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/siltation, potentially significant temporary impacts could occur under CEQA due to an increase in turbidity during construction activities that could result in increased downstream sedimentation (Criterion A). One of the project objectives is to improve overall water quality and the hydrology functions of the lagoon. The temporary construction and maintenance impacts to water and aquatic sediment quality, which would be minimized through a number of physical and regulatory measures, would not be substantially adverse under NEPA.

Permanent

Alternative 2A would construct a new tidal inlet to improve hydraulics and water quality compared to existing conditions. Alternative 2A would provide a long-term water quality improvement throughout the lagoon by permanently increasing circulation and tidal exchange. Alternative 2A would have the greatest beneficial impacts to the lagoon since it would promote the best circulation scenario by allowing the greatest tidal influence and improving the ability to transport sediment from the lagoon to the coast. Sedimentation, one of the water quality impairments identified for the lagoon on the Section 303(d) list, would be reduced under this alternative. Additionally, Alternative 2A would remove a large area of high-nutrient sediments shown in Figure 3.4-1, including within the boundary of the overdredge pit and shallow dredge areas throughout the central basin. Removal of this high-nutrient sediment would help address water quality issues within the lagoon associated with eutrophication. Eutrophication is one of the water quality impairments identified on the Section 303(d) list, and removal of high-nutrient sediments is critical to addressing the impairment.

As shown in Table 3.4-4, Alternative 2A would decrease the existing water residence time of the east basin from 15 days to 4 days, and reduce elevated bacteria concentrations in the nearshore area from approximately 9 days to 1 day. During storm events, bacteria concentrations in the nearshore area near the existing inlet would only exceed the criterion briefly. The duration of the exceedance would be substantially shorter and overall water quality at the nearshore locations would be substantially better than existing conditions (M&N 2012b). Under Alternative 2A, the speed of transport of pollutants through the lagoon may be increased compared to existing conditions; however, the volume and concentration of pollutants are dependent on the watershed upstream from the lagoon and would not change due to the project.

Table 3.4-4
Water Quality Indicators for the Alternatives

Alternative	Residence Time in the East Basin (days)	Elevated Bacteria Concentration near Inlet (days)
Existing	15	9
1A	13	8
1B	8	6
2A	4	1

Source: M&N 2012b

Through the improved circulation gained by the new inlet, Alternative 2A would substantially reduce excessive sedimentation and recurrent inlet closures, substantially help to reduce the ongoing and future impacts from sedimentation/siltation blockage in the lagoon, and greatly improve tidal exchange and sediment transport to the ocean (i.e., beach sand replenishment). Flood drainage from the lagoon would occur much more rapidly with the new inlet than with the existing inlet due to significantly improved hydraulics, leading to less opportunity for sedimentation. The duration of flood drainage (from the upstream lagoon boundary to Highway 101) would be shortened to approximately 20 percent of the duration under existing conditions (M&N 2012b). Additional tidal exchange and flushing would result in larger and heavier particle size (i.e., sand) in the western portions of the channel system where tidal flows may be faster. In the eastern portions of the project where most of the smaller, lighter sediment particles are located, tidal flushing would be slower and the channels would be more resistant to tidal erosion and resulting turbidity. This alternative would require relatively infrequent intermittent inlet maintenance (i.e., every 3–4 years) to remove accumulated sediment near the inlet and maintain improved hydraulics. The amount of material removed would be 300,000 cy and would require approximately 5 months to complete. Currently, 30,000 cy is dredged annually from the lagoon inlet over a 2-week period. Alternative 2A would require less-frequent maintenance, but the volume of sediment removed and time required would be greater. Each maintenance dredging event would have the potential for intermittent or periodic water quality impacts such as turbidity, but **these impacts would be reduced to less than significant with implementation of physical and regulatory measures, including PDFs and BMPs, as discussed above**

(Criterion A). No substantial adverse effects would occur associated with maintenance activities.

Overall, Alternative 2A would provide the most beneficial impact on water and sediment quality. As a result of the increased tidal exchange, improved circulation and drainage pathways, and reduced sedimentation and inlet closures, Alternative 2A would greatly improve water quality and sediment conditions in the lagoon. Stagnant water conditions, which are currently contributing to the elevated bacteria concentrations in the lagoon, would be improved with implementation of Alternative 2A. The greater mixing potential (increased tidal exchange and improved circulation) in the lagoon would reduce bacteria concentrations by allowing greater seawater influence and improving brackish conditions higher in the back waters of the lagoon. In addition, nutrient load would be reduced as a result of the new tidal inlet and removal of large areas of high-nutrient sediments, which would reduce eutrophication within the lagoon. Sediment exchange between the ocean and lagoon would stabilize, and pollutants settling in the sediment would have less potential to accumulate. The result would be a beneficial impact to water and sediment quality through compliance with applicable federal or state standards, and a reduction in potential hazards to human health and biological communities.

Beneficial impacts to water and sediment quality would be expected with implementation of Alternative 2A as circulation and tidal exchange are improved and sedimentation is reduced. Stagnant water conditions would be improved with increased mixing potential, and bacteria concentrations and nutrient load would be reduced. Pollutants would not be generated or released to the environment that are in violation of applicable federal or state standards, hazardous to human health, or deleterious to biological communities. Additionally, changes in hydrologic conditions during construction would not cause sedimentation in downstream areas or result in alterations in circulation that would inhibit vertical mixing or promote stagnation. **Long-term impacts would be less than significant under CEQA (Criteria A and B) and would not be substantially adverse under NEPA.**

Alternative 1B

<u>Temporary</u>

The temporary impacts associated with the implementation of Alternative 1B would be similar, but slightly less than, those discussed for Alternative 2A. Construction activities associated with the proposed development have the potential to impact water quality through the release of pollutants such as sediment, soil stabilization residues, oil and grease, and trash and debris. Soil disturbance would expose soil to erosion from wind and water that could result in sedimentation to receiving surface waters. Increased turbidity could occur during construction activities (i.e., dredging). However, Alternative 1B would require less dredging, grading, and ground disturbance than Alternative 2A, resulting in less temporary impacts (e.g., turbidity, disturbed soil area, and erosion potential). Similar to Alternative 2A, actively managing water levels by temporarily diking off portions of the lagoon being actively dredged would help to control the flow of turbid, disturbed waters and allow for some settling of sediment and other potential pollutants (PDF-27). A cutterhead dredge would be used, which would avoid/minimize the generation of turbidity at the location of the dredge (PDF-27). In addition, following on-site placement of the overdredge material, the overdredge pit would be capped with sand material removed from the proposed inlet location, which would encapsulate the material and prevent it from being introduced into the water column or released into the environment (PDF-28) (M&N 2013) to help minimize sedimentation and turbidity impacts and the potential release of contaminants.

Similar to Alternative 2A, temporary diking and inundation of specific areas during phased construction of Alternative 1B would increase circulation during construction. In impounded areas, the water elevation would increase and surface area would expand. The fetch across impounded areas would increase and dredge equipment movement would provide mechanical circulation, promoting localized lagoon circulation and turnover. Increased erosion and downstream sedimentation would not be anticipated during construction activities, because inundated areas would be subject to slower velocities as they are generally separated from inlet flows. As construction progresses and impounded and dredged areas are opened to tidal action, those areas would have less vegetation and greater tidal exchange, increasing circulation over existing conditions.

BMPs required by the Construction General Permit and County stormwater and MS4 permitting, such as the use of a cutterhead suction dredge to minimize the generation of turbidity during dredging and the use of temporary dikes during initial and maintenance dredging, would also apply. Overall, through the implementation of project design features and state and locally regulated BMPs, Alternative 1B would not result in changes to hydrologic conditions that would cause sediment or inhibit mixing and **would result in less than significant temporary impacts from pollutants generated or released to the environment in violation of applicable federal or state standards, or that would be hazardous to human health or deleterious to biological communities (Criterion B).**

Because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/siltation, the potential temporary turbidity that could be generated by lagoon restoration activities, most specifically the dredging operations, would be considered a potentially significant impact (Criterion A). No substantial adverse impacts would occur under NEPA due to PDFs and regulatory requirements that would be met.

Permanent

Alternative 1B would slightly improve flood hydraulics when compared to existing conditions, with correspondingly less sedimentation predicted to occur under the typical and 100-year flood scenarios (M&N 2012b). This alternative would moderately improve water quality conditions by decreasing the existing east basin water residence time from 15 days to 8 days (Table 3.4-4) and improve the ability to move sediment through the lagoon. As described under Alternative 2A, the increased speed of pollutant transport through the lagoon as a result of the project would not result in increases in pollutant levels at the lagoon outlet. However, existing high bacteria concentrations in the nearshore area would not be improved relative to existing conditions (Table 3.4-4) because, unlike Alternative 2A, Alternative 1B does not include the construction of a new tidal inlet to improve ebb/flood water flow, which would result in reduced bacteria concentrations. Elevated bacteria concentrations near the inlet would be slightly improved as compared to existing conditions, lasting approximately 7 days (Table 3.4-4).

Similar to Alternative 2A, Alternative 1B would address listed water quality impairments for both sedimentation and eutrophication. Sedimentation would be reduced under this alternative through increased hydraulic efficiency, allowing fluvial flows to maintain velocities as the lagoon drains. Additionally, Alternative 1B would remove a large area of high-nutrient sediments shown in Figure 3.4-1, including within the boundary of the overdredge pit and shallow dredge areas throughout the central basin. Removal of this high-nutrient sediment would help address water quality issues within the lagoon associated with eutrophication.

Annual inlet maintenance under Alternative 1B would occur. Sediment removal during intermittent maintenance would be conducted using land-based construction equipment similar to current methods and would create similar intermittent or periodic short-term water quality impacts in the lagoon and beach environments. The volume of removed sediment would be slightly larger at 40,000 cy and would require 4 weeks to complete as opposed to 2 weeks, currently. However, it is anticipated that larger grain-sized sediments would be removed, which would be expected to settle out relatively quickly, thereby minimizing water quality impacts related to sedimentation/turbidity.

Alternative 1B would result in a beneficial impact to hydrology by moderately improving lagoon circulation and decreasing stagnation. Stagnant water conditions would be improved and nutrient load would be reduced compared to existing conditions as a result of increased circulation and removal of high-nutrient sediments, which would reduce eutrophication within the lagoon. Sediment exchange between the ocean and lagoon would be improved from existing conditions. Overall rates of sedimentation would be lower than those under existing conditions due to improved flow conveyance (M&N 2012b). The result would be a beneficial impact to water and sediment quality through improved circulation and a reduction in potential hazards to human health and biological communities over the long term. With the incorporation of appropriate and maintained BMPs that are mandated during these maintenance events, **water and sediment quality impacts would be less than significant (Criteria A and B). No substantial adverse indirect impacts to water and sediment quality have been identified associated with implementation of Alternative 1B.**

Alternative 1A

Temporary

Temporary impacts from implementing Alternative 1A would be similar to those discussed for Alternative 1B; however, Alternative 1A would involve less dredging, grading, and ground disturbance (i.e., reduced turbidity, less disturbed soil area, and less erosion potential) than Alternative 2A and Alternative 1B; therefore, temporary impacts would be less at the time of construction. Similar to Alternative 2A and Alternative 1B, construction activities associated with Alternative 1A have the potential to impact water quality through the release of pollutants such as sediment, soil stabilization residues, oil and grease, and trash and debris. Soil disturbance would expose soil to erosion from wind and water that could result in sedimentation to receiving surface waters. Increased turbidity could occur during construction activities (i.e., dredging). Under Alternative 1A, areas would not be actively diked off, and the majority of dredging would occur in existing active channels, which are characterized by less silty sediments than those in small tributary channels or densely vegetated areas. In addition, a cutterhead dredge would be used, which would avoid/minimize the generation of turbidity at the location of the dredge (PDF-27). Alternative 1A, like the others, would require a project SWMP and SWPPP and protective BMPs, as described above.

No temporary dikes would be used under Alternative 1A. Circulation would not be affected by Alternative 1A during construction, other than as areas are dredged they would become more exposed to tidal exchange and circulation would be gradually increased throughout the construction process. In addition, some minor increases in localized circulation would occur due to dredge equipment movement. Stagnant water conditions would not increase over existing conditions as a result of construction activities. Only minor changes in circulation would occur, so increased downstream sedimentation would not be anticipated during construction activities.

BMPs required by the Construction General Permit and County stormwater and MS4 permitting, such as the use of a cutterhead suction dredge to minimize the generation of turbidity during dredging and the use of temporary dikes during initial and maintenance dredging, would also apply. Overall, through the implementation of project design features and state and locally regulated BMPs, Alternative 1B would not result in changes to hydrologic conditions that would cause sediment or inhibit mixing and **would result in less than significant temporary impacts from pollutants generated or released to the environment in violation of applicable federal or state standards, or that would be hazardous to human health or deleterious to biological communities (Criterion B).**

However, because the lagoon is listed as a CWA Section 303d impaired waterbody for sedimentation/siltation, the potential temporary turbidity that could be generated by lagoon restoration activities, most specifically the dredging operations, would be considered a potentially significant impact (Criterion A). No substantial adverse impacts would occur under NEPA due to PDFs and regulatory requirements that would be met.

<u>Permanent</u>

Alternative 1A would change water quality conditions in the lagoon by providing marginal improvements in circulation and tidal exchange. It would decrease the residence time in the lagoon by 2 days compared to existing conditions, but would not substantially improve high bacteria concentrations in the lagoon (Table 3.4-4). Elevated bacteria concentrations in the nearshore area near the inlet would be slightly improved as compared to existing conditions, lasting approximately 8 days. The existing inlet would likely continue to be subjected to sedimentation and recurrent closures to ocean exchange. As discussed under Alternative 2A, increases in pollutant transport speed from the project would not result in an increase in nearshore pollutant concentration levels. Alternative 1A would primarily remove sediments from the main channel, which contains some areas of high nutrients, as shown in Figure 3.4-1. This alternative would not extend sediment removal into the majority of the central basin, however, and would leave the majority of high-nutrient sediments intact. Eutrophication is one of the water quality impairments identified on the Section 303(d) list, and removal of high-nutrient sediments is critical to addressing the impairment. Therefore, Alternative 1A is not anticipated to result in substantial benefits to eutrophication that currently occurs in the lagoon.

Alternative 1A would not substantially improve lagoon water quality when compared to existing conditions (M&N 2012b), although assuming the current inlet maintenance program is continued, no substantial additional deterioration of water quality conditions beyond existing conditions would be expected. As a result of conversion continuing to occur in the central basin from mudflats to a more densely vegetated area, tidal exchange and circulation in that focused area may decrease, leading to additional sedimentation and water quality issues. Enlarging the main channel through the basins would enhance the ability of the lagoon to drain fluvial flows and sediments, but not substantially. Therefore, sedimentation in the east basin is not anticipated to be substantially decreased from existing conditions. Existing elevated bacteria concentrations within the lagoon would also be expected to continue due to continued stagnant water conditions that would not be eliminated by this alternative. Under Alternative 1A, the water quality impairments identified on the Section 303(d) list would not be addressed. In terms of long-term intermittent or periodic maintenance, Alternative 1A would be similar to current maintenance with annual sediment removal of approximately 35,000 cy using land-based equipment and taking 2 weeks to complete. Accordingly, **Alternative 1A would have a less than significant impact to lagoon water and sediment quality, but would not alleviate lagoon water quality impairments (Criteria A and B). Substantial adverse indirect impacts to water and sediment quality under NEPA would not occur with implementation of Alternative 1A.**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would enable existing conditions to continue. High-nutrient sediments would remain in place in the lagoon, and eutrophication concerns would continue. Tidal flows would continue to be restricted due to the narrow and meandering channel between Coast Highway 101 and the NCTD railroad, resulting in continued sedimentation in the east basin. Tidal ranges would remain substantially muted for both high and low tides, which would continue to be increasingly and progressively muted from the west basin through the east basin. Under the No Project/No Federal Action Alternative, water quality impairments identified on the Section 303(d) list would not be addressed. The need for maintenance intervals and inlet opening would continue to occur annually, removing 30,000 cy of sediment and taking 2 weeks to complete. These maintenance intervals would also be expected to temporarily increase localized turbidity, similar to existing conditions. However, larger grain-sized sediments would be removed during maintenance intervals, which would settle out relatively quickly, minimizing water quality impacts related to sedimentation/turbidity. No additional benefit to lagoon water and sediment quality would be provided. No new impacts would be anticipated by the No Project/No Federal Action Alternative; however, conditions would remain unchanged and a degraded lagoon environment would continue to decline. **No substantial adverse effects would be anticipated under the No Project/No Federal Action Alternative, and impacts would be less than significant (Criteria A and B).**

Materials Disposal/Reuse Study Area

The disposal and/or reuse of dredged sediments/excavated soils during construction for the three alternatives considered is addressed below. The No Project/No Federal Action Alternative is not discussed further since it would not involve the disposal of dredged sediments outside of the EPA-approved LA-5 site. Materials placement required as part of inlet maintenance is discussed above under permanent impacts for each of the alternatives. Criterion A is not discussed in this section as materials disposal and/or reuse would not alter hydrologic conditions or circulation patterns that would inhibit mixing or cause sedimentation.

Alternative 2A

Alternative 2A would involve placement of material on-site, and could include placement at offshore, nearshore, and/or onshore sites along the neighboring coast. Lagoon sediments have been tested and found to consist of two stratigraphic layers, as described below.

The uppermost layer is relatively thin and composed of silts, clays, and organic matter. Evidence from sediment testing shows that some areas within this layer contain some harmful chemicals (i.e., DDD, DDE, and PCBs). Sediment testing found low levels of Aroclor PCBs in upper and lower layers within the east basin. These values were found to be above their respective ERL screening levels (M&N 2013). This fine organic upper-layer material is not suitable for beach reuse and would require disposal. Under Alternative 2A, this material would be disposed of in the overdredge pit proposed in the central basin, based on initial coordination with the Corps and EPA. Following placement of the silty upper material, the overdredge pit would be capped by material dredged from the proposed inlet location, which would encapsulate the material and prevent it from being introduced in the water column, essentially isolating it from the water column and preventing it from causing water quality impacts.

The lower layer (approximately 2 to 3 feet bgs) in the central basin is primarily sand with approximately 10 percent fines and is at least 80 feet thick (M&N 2010). The age of the sediment layer suggests that anthropogenic sources of harmful chemicals are not contained in these alluvial deposits. This material has been analyzed compliant to Corps and ITM requirements and has been found suitable for reuse on beaches (M&N 2013). Chemistry data was collected from the proposed beneficial reuse placement sites as a component of the SAP. The sediment quality of the placement sites was determined to be chemically compatible with the source site. The upper layer of sediment within this area has been identified as having DDT levels above the ERL threshold, and would be sequestered within the overdredge pit, as discussed above. Since deeper material has been determined suitable for reuse and the poorer quality material would be safely sequestered on-site, **less than significant impacts from its disposal/reuse would be expected (Criterion C). No substantial adverse impacts would occur under NEPA.**

Up to 1.4 mcy of material would be placed in various potential locations on-site, offshore, nearshore, and onshore (see Table 2-21). When depositing material, some sediment fraction would remain suspended in the water column for various lengths of time depending on particle size and water movement. There would also be a degree of sediment resuspension in the water column of the deposition area, as well as the area of the seafloor where resident sediments would be physically disturbed and dislodged for a short period. Using a construction strategy that creates an overdredge pit would enable the majority of material produced by the project to be used beneficially as littoral cell nourishment, while providing a location on-site for materials unsuitable for beneficial reuse (either due to contamination or grain size).

Sediment plumes associated with placing material at reuse or disposal sites in the ocean would be subject to dispersion and dilution by ambient currents, wind, and wave action. The behavior and fate of suspended sediment plumes would vary substantially depending on the nature of the deposition operations, characteristics of the bottom sediments, and current patterns and oceanographic conditions. Regardless, the areas affected can be characterized in three ways:

- *Initial mixing zone*: the area where deposition operations dominate the process and induced currents are more important than ambient currents;
- *Near-field zone*: the area where the plume area is characterized by rapid particle settling and changes in suspended sediment concentrations with distance from the deposition; and
- *Far-field zone*: the area where the total load in the plume is slowing and diffusion is the same order of magnitude as particle settling.

In general, the initial mixing zone is associated with the area in the immediate vicinity of the point of placement (in nearshore or offshore sites), whereas the transition between the near-field to the far-field zones typically occurs within several hundred feet of the point of placement. The location in the far-field zone at which the plume is no longer distinguishable from background conditions would vary in relation to the differences in turbidity and suspended sediment levels in the plume and adjacent receiving waters.

The vertical (depth-related) extent of plumes depends on the initial displacement of bottom sediments, physical characteristics and settling velocities of the sediment particles, and vertical mixing characteristics of the water column. For example, the vertical distribution of sand-sized particles disturbed when disposed material strikes the bottom may be confined to the near-bottom water layer, particularly when the bottom sediments consist of coarse-grained, rapid-settling particles and a natural density gradient is present in the water column that limits vertical mixing. In contrast, disturbed fine-grained sediments may remain suspended and distributed throughout the water column for long periods, particularly during winter (unstratified) conditions. Similarly, plumes generated by placement activities can extend throughout the water column as particles settle at varying rates depending on particle size and depth-varying current speeds.

The elevated suspended solids concentrations in turbidity plumes reduce water clarity/light transmittance, and increase discoloration. Table 3.4-5 shows the estimated sediment plume length expected to occur from depositing spoils at disposal/reuse sites in onshore, nearshore, and offshore locations (Merkel 2014; Appendix H). These estimates assume a median particle size of 0.20 millimeter (mm), as determined through sediment characterization (M&N 2010) and a settling velocity of 0.08 feet per second (ft/s), which is the material anticipated for Alternative 1B and Alternative 2A. For Alternative 1A, where fines would be deposited at LA-5, a smaller median grain size was used.

Table 3.4-5
Estimated Sediment Plume Length at Potential Disposal/Reuse Sites

Disposal/Reuse Location	Current Velocity (knots)	Depth (ft)	Plume Length (ft)
Onshore	1.5–3.0	10	313–625
Nearshore	1.5–3.0	15	469–938
Offshore	0.5–1.5	25	781–1563
Offshore*	0.5–1.5	25	2,083–4,166

*assumes median particle size of 0.10 mm and a settling rate of 0.03 ft/s (WEF 1991)
Source: Merkel 2014 (Appendix H)

The estimated plume distance on any given day would vary according to the grain size characteristics of the material, turbulence, current speed, and to what depth in the water column the particles are resuspended. Use of the overall mean grain size diameter indicates average plume extent. Silt/clays resuspended during dredging may travel longer distances than indicated in the table.

The primary changes to water quality expected from materials placement associated with Alternative 2A would be temporary and localized increases in turbidity and suspended sediment concentrations. With a settling velocity of 0.08 ft/s, a sediment particle would settle to the ocean floor in approximately 5 minutes at a depth of 25 feet. However, for the deepest locations offshore (SO-5 and SO-6), this alternative would involve placing materials via a vertical pipe extending from the barge downward toward the ocean floor to reduce the drop height and settling time (and potential sand drift and loss) (PDF-52). The estimates in Table 3.4-5 (Merkel 2014: Appendix H) are expected to represent worst-case scenarios. Resuspension of sediments can also affect other water quality parameters such as DO and pH within the zone of influence. As noted above, this depends on numerous environmental factors, although it is anticipated effects would be short term and localized. Therefore, no long-term reductions in water quality would be anticipated due to the diluting capacity of the ocean, localized nature of the turbidity plumes, and rapid dissipation once placement operations ceased. In addition, as part of compliance with the Section 401 water quality certification required from the RWQCB, water quality monitoring would be conducted to ensure water quality standards are met (PDF-53).

With use of the overdredge pit for retaining fine-grained material on-site, releasing material toward ocean floor, the temporary and localized nature of turbidity plumes and rapid dissipation, and water quality monitoring, the disposal of dredged sediments/excavated soils would not generate or release pollutants that are in violation of applicable federal or state standards, hazardous to human health, or deleterious to biological communities, and would not cause substantial adverse changes to water or sediment quality, toxicity or bioaccumulation of contaminants in aquatic biota, or declines in wildlife habitat. **Impacts would be less than significant under CEQA (Criteria B and C) and not substantially adverse under NEPA.**

Alternative 1B

The impacts related to this alternative would be slightly less than those associated with Alternative 2A. This alternative would dispose/reuse approximately 1.2 mcy of material dredged from the lagoon. This alternative would also utilize a construction strategy creating an overdredge pit and providing material for littoral cell nourishment, similar to Alternative 2A. Potential sites for placement and construction methods would be the same as those for Alternative 2A, and water quality monitoring in compliance with the water quality certification will be required (PDF-53). Under Alternative 1B, the disposal of dredged sediments/excavated soils would not generate or release pollutants that are in violation of applicable federal or state standards, that are hazardous to human health, or are deleterious to biological communities. Alternative 1B would not cause substantial adverse changes to water or sediment quality, toxicity or bioaccumulation of contaminants in aquatic biota, or declines in wildlife habitat. **Impacts would be less than significant under CEQA (Criteria B and C) and not substantially adverse under NEPA.**

Alternative 1A

Alternative 1A would not produce material suitable for reuse within the littoral zone and up to 160,000 cy of silty surface material would require disposal at the offshore disposal site, LA-5. An overdredge pit would not be constructed for on-site disposal. Dredged material would have a high proportion of fines, ranging from approximately 20 percent to 78 percent from the west to the east basin of the lagoon, respectively. The SAP (Appendix A) showed that some areas within the upper layer of fine material have pesticide (i.e., DDD and DDE) contamination and PCB levels that meet or exceed their ERLs (Table 3.4-2). These results indicate that this material may be suitable for use at LA-5. If Alternative 1A is selected for implementation, additional Tier 3 testing would be required prior to Corps and EPA approval of the proposed disposal. Should the materials be determined to be not suitable for disposal at this location, the material would be sequestered on-site in built transition or nesting areas.

Since the upper strata material dredged from the lagoon would be discharged near the surface of the ocean (i.e., without the benefit of a vertical discharge pipe used for the more valuable beach sand spoils), the resulting plume would be expected to remain suspended in the water column for a much longer period of time (i.e., hours) than that for the deeper, heavier material dredged in Alternative 2A and Alternative 1B (Appendix H). The plume's travel distance and dilution would depend on ambient currents, wind, and wave action existing at the time of disposal.

Assuming offshore maximum expected water current speeds from 0.5 to 1.5 knots at LA-5 at the time of disposal, the plume would be visible for approximately 13 minutes and travel approximately 2,000 to 4,000 feet (Appendix H); however, the anticipated turbidity is not expected to occur for extended periods of time. Material disposed at LA-5 would have to comply with the requirements set by the Corps and EPA (EPA 1998), and, as noted above, preliminary coordination with the Corps and EPA indicates that the level of contamination appears appropriate for disposal at LA-5 (M&N 2013). If approval is not obtained from the Corps and EPA for disposal at this location, the material would be sequestered on-site. As a result, under Alternative 1A, the disposal of dredged sediments/excavated soils would not generate or release pollutants that are in violation of applicable federal or state standards, hazardous to human health, or deleterious to biological communities, and would not cause substantial adverse changes to water or sediment quality, toxicity or bioaccumulation of contaminants in aquatic biota, or declines in wildlife habitat. **Impacts would be less than significant under CEQA (Criteria B and C) and not substantially adverse under NEPA.**

3.4.4 Avoidance, Minimization, and Mitigation Measures

A number of project design features that minimize erosion and the release of pollutants into the environment have been incorporated into the project, including use of a cutterhead suction dredge and capping the overdredge pit, when applicable.

However, the following mitigation measures are required for CEQA significant impacts related to turbidity.

Mitigation measure Water Quality-1 would be required under CEQA for implementation of Alternative 2A, Alternative 1B, and Alternative 1A. Mitigation measure Water Quality-2 would be required under CEQA for implementation of Alternative 2A and Alternative 1B.

Water Quality-1 All additional conditions, BMPs, and requirements that are identified by regulatory agencies prior to project initiation as part of the permitting process for the project, including Section 404 permit, Coastal Development Permit, Section 1601 permit, Section 401 Water Quality Certification, and the NPDES

MS4 permit, must be implemented. Compliance with those permit conditions shall be monitored through the construction monitoring program and the contractor shall certify to the engineer of record that they have been completed.

Water Quality-2 Turbidity levels shall be actively managed by using a cutterhead dredge and/or temporarily closing the lagoon inlet. The overdredge pit shall be capped with sand material to encapsulate material and prevent it from introducing turbidity or pollutants into the water column or released into the environment. The contractor shall certify to the permit holder that the dredge operations are not responsible for release of sediments into the water column at levels resulting in increased downstream sedimentation.

3.4.5 Level of Impact after Mitigation

CEQA conclusion: Impacts to water quality associated with turbidity would be reduced to less than significant with implementation of the mitigation measures above.

NEPA conclusion: No substantial adverse impacts associated with water or sediment quality have been identified due to implementation of the SELRP.

3.5 GEOLOGY/SOILS

This section is derived from a number of existing documents, including the Geotechnical Data Report for the SELRP (URS 2012, Appendix M), the SAP (M&N 2013, Appendix A), the 2012 RBSP EA/EIR (SANDAG 2011), and the *San Elijo Lagoon Enhancement Plan* (County of San Diego 1996). Section 3.3 (Oceanography/Coastal Processes) addresses beach conditions and sand transport, including erosion of beach sand; so these are not addressed here.

3.5.1 AFFECTED ENVIRONMENT

The project study area is located within the coastal plain of the Peninsular Ranges Geomorphic Province and consists of marine and nonmarine terraces dissected by San Elijo Lagoon. Coastal bluffs extending north and south of the lagoon range up to 100 feet in height and can be steeply sloped cliffs along the coast in a series of wave-cut terraces.

San Elijo Lagoon Study Area

Historic Geologic Setting

San Elijo Lagoon was formed during a period of sea level lower than present day, when the shoreline was farther to the west, and rivers and creeks in the San Diego area cut channels downward and extending offshore. This formed steep canyons and, as sea level rose through the Holocene period, rivers backfilled their channels. San Elijo Lagoon is within the backfilled former channel of Encinas Creek. Present sediments within the lagoon were deposited within a shallow intertidal setting with some alluvial deposition during floods or other periods of high runoff from the surrounding valleys. At the inlet of the lagoon, a sill of rock of the Delmar Formation influences shoaling, inlet stability, and tidal exchange between the ocean and lagoon (URS 2012).

Steep bluffs border the lagoon on the north and south sides. These bluffs are generally composed of tertiary marine deposits of the Delmar and Torrey sandstone formations, topped by Lindavista red sandstone formations (County of San Diego 1996). The Delmar Formation is generally described as dusky yellowish-green sandy claystone interbedded with medium-gray coarse-grained sandstone (California Department of Conservation, Division of Mines and Geology 1996). The San Elijo Lagoon Enhancement Plan identifies this stratum as overlain by a 5- to 25-foot layer of mudstone, with a number of fossiliferous (brackish water mollusks) beds occurring near the lagoon toward the top of the formation. The Torrey Sandstone Formation overlays the Delmar Formation, and is white to light brown in color and medium- to coarse-grained in texture. The Lindavista Formation caps the terraces and is a reddish brown, interbedded sandstone and conglomerate.

Generally, sediment in the lagoon is characterized as alluvium and colluviums (California Department of Conservation, Division of Mines and Geology 1996), consisting of unconsolidated silt, clay, sand, and gravel. The Natural Resources Conservation Service (NRCS) Soil Survey classifies the majority of the west and central lagoon basins as lagoon waters (LG-W). Other NRCS soil classifications located throughout the southern edge of the lagoon and the east basin generally include (NRCS 2014):

- Chino silt loam (CkA), saline, 0–2 percent slopes
- Corralitos loamy sand (CsC), 5–9 percent slopes
- Corralitos loamy sand (CsD), 9–15 percent slopes
- Huerhuero loam (HrE2), 15–30 percent slopes, eroded
- Loamy alluvial land Huerhuero complex (LvF3) 9–50 percent slopes, severely eroded
- Terrace escarpments (TeF)
- Tidal flats (Tf)

Cretaceous metavolcanic and granitic rock underlay the lagoon, with approximately 150 feet of alluvial clay and silts overlaying this foundation (County of San Diego 1996). Sand is also mixed in with this sedimentary layer. Specific soils testing of the lagoon sediments was conducted to determine the specific extent of clays and silts compared to sand in order to identify potential materials disposal needs and reuse opportunities. These studies are described in more detail below.

Subsurface Testing

Subsurface explorations at the lagoon were conducted between fall 2011 and spring 2012 to help determine the most effective materials disposal scenario and the potential for beneficial reuse of materials from the SELRP. The results of this effort are detailed in the Geotechnical Data Report (Appendix M) and the SAP Report and are summarized below. The SAP (Appendix A) indicates that material excavated from the overdredge pit location (below approximately 2–3 feet bgs) is likely suitable for placement on beaches or in the nearshore based on physical properties related to grain size and material chemistry based on information generated to date. These materials consist, on average, of 10 percent fines and are classified as sand. The age of this sediment layer suggests it has been removed from modern sources of pollution. Additional evaluation of the preferred alternative and placement option with these agencies may be required to obtain a final compatibility determination if changes to the project or to on-site conditions occur prior to construction, or if significant time delays occur in project processing. Additional evaluations would consist of supplemental geotechnical borings and testing for material grain size and chemistry.

Other samples collected show two distinct sedimentary layers generally extending through the lagoon basins, including (1) a relatively thin clay/silt layer extending from the ground surface to average depths of approximately 2 to 4.5 feet bgs, and (2) silty sand to poorly graded sand to the maximum depth of the borings. The silty clay to clayey silt layer was mostly classified as CH (clay, high plasticity) and ML (silt, low plasticity) type soils, according to the Unified Soil Classification System. This layer was generally continuous through the lagoon, but varied in thickness and depth, extending to approximately 9 feet thick in the east basin and thinning out substantially toward the west, even disappearing completely in parts of the west basin. Below this clay/silt layer, loose to medium dense, grey to dark grey silty sand to poorly graded sand was encountered to depths up to approximately 31.5 feet bgs. These sandy deposits were primarily fine-grained sand with a small percentage of medium-grained sand and are classified as SM (silty sand), SM-SP (poorly graded sand), and SP type soils. Shell fragments and sparse pebbles and gravel were observed in some of the borings. No hard substrate was encountered (e.g., gravel or bedrock) in any of the boring locations (URS 2012).

Faulting and Seismicity

The project study area is located in a moderately active seismic region of southern California subject to ground-shaking from nearby fault zones. The Rose Canyon fault zone is an active offshore/onshore fault capable of generating an earthquake of magnitude 7.2 on the Richter scale (Ninyo & Moore 2012). The fault zone lies partially offshore as part of the Newport/Inglewood fault zone and parallels the northern coastline of the San Diego region within approximately 2 to 6 miles until coming ashore near La Jolla Shores. The onshore segment trends through Rose Canyon, through Old Town San Diego, and appears to die out in San Diego Bay (Abbott 1989). In the event of an earthquake, the Rose Canyon fault zone, which occurs at a distance of approximately 2.5 miles from the study area, can result in moderate to severe groundshaking in the coastal area of northern San Diego County.

The project area is not located within a Fault-Rupture Hazard Zone as delineated by the California Geological Survey under the Alquist-Priolo Earthquake Fault Zoning Act (California Department of Conservation 2012).

The existing Highway 101 bridge structure is seismically deficient and currently subject to collapse during a seismic event due to a shear failure in the pile extensions beneath the pier wall repairs (TY Lin 2011). The structure was originally constructed in 1934 and subsequently widened in 1953. Repairs have been made to the bridge pile extensions at various times, and recommendations were made that the City of Encinitas pursue the development of a seismic retrofit strategy.

Liquefaction

Liquefaction occurs primarily in saturated, loose, fine- to medium-grained soils in areas where the groundwater table is generally 50 feet or less below the surface. When these sediments are shaken during an earthquake, a sudden increase in pore water pressure causes the soils to lose strength and behave as a liquid. The soils and geologic conditions associated with San Elijo Lagoon are susceptible to liquefaction due to seismic shaking (Ninyo & Moore 2012).

Erosion

Historically, activities occurring throughout the watershed, such as roads, agriculture, and construction, resulted in erosion and suspended solids in runoff. These solids subsequently settled out as sedimentation in the lagoon. Escondido Creek and, to a lesser extent, La Orilla Creek, are the historic principal transporters of alluvial sediment. Erosion of gullies also provided a substantial historic source of sediment for the lagoon. Much of the sediment delivered to the lagoon due to erosion was from past activities when construction and agricultural activities were high. The rate of sedimentation has decreased with buildout of the watershed and agricultural areas, as well as the initiation of conservation practices (County of San Diego 1996).

Materials Disposal/Reuse Study Area

The geology of the individual materials disposal/reuse sites is described below. Beach placement sites are generally cobble to sandy beaches that vary in width, depending on the annual and seasonal variability in the littoral cell coastal processes, as described in Section 3.3 Oceanography/Coastal Processes.

The *Coast of California Storm and Tidal Waves Study* (CCSTWS) concluded that the future condition of the beaches in northern San Diego County would be governed by cycles of accretion and erosion similar to those of the past 50 years, with accelerated trends toward erosion due to the following conditions: (1) reduction of riverborne sediment due to impoundment by dams, (2) influence of Oceanside Harbor, and (3) increase in the rate of sea level rise (Corps 1991). The EIR/EA for the 2012 RBSP (SANDAG 2011) discusses sediment supply patterns in the Oceanside Littoral Cell. The discussion identified historical sources of sediment for beaches within the littoral cell as bluffs, rivers, streams, and lagoons. However, since the 1950s, dams and construction of Oceanside Harbor have substantially reduced these sediment sources and urbanization has accelerated the erosion rate of coastal bluffs and decreased the rate of sediment reaching the ocean through coastal lagoons. Thus, current sources of onshore littoral material primarily include rivers, bluffs, and artificial fills.

Cardiff

Cardiff State Beach consists of a rocky (cobble) beach that lies on a shallow, wave cut platform. Beach characteristics differ based on seasonal and annual variability, and the beach occasionally becomes stripped of most of its sand from large waves that generally occur during the winter months. Portions of the site have had sand placement in the past as part of beach nourishment projects. Riprap extends along the northern extent of the beach to protect existing commercial buildings (Restaurant Row). The proposed onshore placement site is located directly seaward of San Elijo Lagoon and south of the existing lagoon mouth, extending to the Seaside Parking Lot at the south end of Cardiff State Beach. The nearshore placement site offshore of Cardiff State Beach would be located offshore of the beach within the littoral zone, as described in Section 3.3 Oceanography/Coastal Processes. The ocean floor at the placement site is predominantly sandy material, and is bounded by hard substrate on the north and south sides. Sand moves through the site naturally, influenced by littoral processes discussed in Section 3.3.

Leucadia

The Leucadia placement site is located on a low terrace, which lies in front of coastal cliffs that characterize Leucadia's beaches. The steep coastal cliffs in this area directly abut the back beach and have been continually forming due to wave action cutting against the marine terrace. The existing placement site comprises the flat, rocky, shallow part of the shoreline visible during periods of low tide.

Moonlight Beach

The Moonlight Beach placement site was formed from sand and rocks that originated from upland erosion. The placement site consists of a relatively thin sand layer, which varies in width and lies on a shallow rock platform. The placement site is relatively wide although beach widths decrease to the north and south, where coastal bluffs line the coast. Sand is placed on this beach by the City of Encinitas and was also a placement site for the 2012 RBSP. Riprap is located at the northern extent of the placement site to protect residential uses.

Solana Beach

The Solana Beach placement site consists of a low tide terrace (wave-cut platform), which lies in front of coastal cliffs south of San Elijo Lagoon. The steep coastal cliffs in this area directly abut the back beach and have been continually forming from wave action cutting against the marine terrace. This process has occurred since the last relative still-stand of sea level, approximately 6,000 years ago (FRH 1997). The proposed placement site received sand from the 2012 RBSP and consists of a variable layer of sand cover over scattered rocks and cobbles visible during low tide in the flat, rocky, shallow part of the shoreline.

Torrey Pines

The Torrey Pines placement site is located on a low tide terrace, which lies in front of coastal cliffs to the north and south of Los Peñasquitos Lagoon. The steep coastal cliffs in this area have been continually forming from wave action cutting against the marine terrace. The existing placement site is characterized by a variable layer of sand cover over the flat, rocky, shallow part of the shoreline visible during low tide, depending on littoral processes and sand placement associated with intermittent inlet maintenance of Los Peñasquitos Lagoon.

Similar to other lagoons in the region, Los Peñasquitos Lagoon was formed in the geologic past when the sea level was lower, the shoreline was farther to the west, and existing streams quickly eroded the exposed marine terraces. Los Peñasquitos Lagoon is an intermittent tidal lagoon due to occasional lagoon closures from sediment accretion at the channel inlet (see also Section 3.3 Oceanography/Coastal Processes).

SO-5/SO-6

Marine geophysical surveys and vibracore investigations were conducted at SO-6 and SO-5 for the RBSPs. The SO-6 site is located in the Swami's SMCA offshore of San Elijo Lagoon and extends both north and south of the San Elijo wastewater outfall pipeline. The SO-6 stockpile areas yielded good-quality coarse sand, but contained some areas of hard-bottom areas as well as bedrock. SO-5 is located offshore of San Dieguito Lagoon, in the paleochannel of the San Dieguito River. Marine surveys conducted for the 2012 RBSP indicated that the deepest portion of the paleochannel appears to be in the northern portion of SO-5, with the seafloor texture appearing to be sandy.

LA-5

LA-5 is an offshore sediment disposal site located approximately 6 nautical miles from the San Diego coastline. The site depth ranges from 460 to 660 feet with a 6,000-foot diameter (Corps 2010). The regional seaward features of the San Diego area are a submerged extension of the Peninsular Ranges. The irregular topography of the basins and ridges parallel the structural orientation of the onshore ranges. The mainland shelf seaward of the San Diego Harbor consists mainly of tightly folded late Beogene sandstone and shale, covered extensively with Quarternary sands and muds (EPA 1987). As described in the EIS prepared for the use of the LA-5 location for sediment disposal, samples of bottom sediment were generally sandy-silt and averaged 3 percent gravel, 52 percent sand, 33 percent silt, and 12 percent clay (EPA 1987).

3.5.2 CEQA Thresholds of Significance

A significant impact related to geology/soils would occur if implementation of the proposed project would:

A. Expose people or structures to substantial adverse effects involving slope instability/landslides;

B. Result in substantial soil erosion or the loss of topsoil;

C. Expose people or structures to substantial adverse effects involving seismically induced ground shaking causing liquefaction, settlement, ground rupture, or lateral spreading and damage; or

D. Result in the destruction or modification of any unique geologic or physical features.

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

3.5.3 Environmental Consequences

This section discusses the environmental consequences, or impacts, associated with the proposed project related to geology/soils. Potential adverse, significant, or beneficial direct and indirect impacts are identified.

Multiple transportation infrastructure and bridge projects are currently planned within the lagoon. Structural integrity is a critical component for all bridges, and there are engineering standards/codes that dictate design standards and reviewing entities that ensure standards are met. The I-5 bridge widening over the lagoon is proposed by Caltrans and would be implemented as part of the I-5 North Coast Corridor improvements. The double-tracking project through the lagoon is proposed by the LOSSAN Rail Corridor Agency and would be implemented by SANDAG/NCTD. Each implementing agency would perform internal quality reviews of engineering design to confirm that applicable regulatory safety requirements and engineering/building codes are satisfied. Each agency employs qualified experts to perform design and quality assurance. For instance, Caltrans' Division of Design and/or Division of Engineering Services would provide review and approval, as appropriate, for the I-5 bridgework. Improvements proposed to Coast Highway 101 as part of the restoration effort would also be required to meet these engineering design standards/building codes. Coast Highway 101 was part of the State Highway system, but is now under the ownership of the City of Encinitas. Any bridge improvements would be checked for standard/code compliance by the City of Encinitas, at a minimum, and possibly also by Caltrans. All of these entities have professional engineering staff and required review procedures to confirm that engineering/design standards/codes would be implemented for bridge/infrastructure improvements.

Lagoon Restoration

Alternative 2A

Restoration activities within the lagoon would require the dredging, removal, and backfill of large quantities of material. Approximately 1.4 mcy would be removed from the lagoon basins and tidal channels. The extent of dredging and other ground disturbance for Alternative 2A can be seen in Figure 2-12. The conceptual layout has been prepared to provide adequate hydraulics for the conveyance of tidal and flood flows and varies in dimension depending on the location. Slopes were selected to mimic the current stable shorelines. The currently designed side slopes vary from 5:l (horizontal to vertical) for the larger open channels and overdredge pit, 3:1 for the smaller channels, and 2:1 at the temporary basin and bridge restrictions. Between habitat areas throughout the lagoon basins, slopes would be flatter and vary throughout the lagoon depending on area and geometry.

The overdredge pit has been specifically designed with appropriate distance from the NCTD railroad embankment so that even if the pit unexpectedly collapsed and it assumed a slope equal to its angle of repose, the railroad embankment stability would be unaffected. At the currently designed side slopes of 5:1, there would be a distance of approximately 145 feet from the top edge of the overdredge pit to the railroad embankment toe, and a distance of approximately 350 feet from the overdredge pit toe to the railroad embankment toe. The proposed 2:1 (horizontal to vertical) railroad embankment fill slope would be covered with riprap. The presence of the dredge pit should not cause lateral slope stability or deformation of the 2:1 fill embankment (Ninyo & Moore 2014). If the overdredge pit slope were to become unstable during a strong earthquake, there would be sufficient distance between the overdredge pit and the railroad berm to preclude impacts to the berm from the pit due to the relatively flat 5:1 slope across 350 feet. Thus, the potential for seismically induced lateral spread into the dredge pit is considered negligible (Ninyo & Moore 2014).

Potential for pit slope instability only exists when the pit is empty (i.e., before the pit is filled with dredge material from the lagoon), which would be for a relatively short time of several months. As detailed in the reports prepared regarding stability and geologic hazards related to the LOSSAN Double Track Project (Ninyo & Moore 2012, 2014), a 100-year earthquake event would not be strong enough to trigger significant liquefaction of the on-site soils. However, liquefaction could be triggered by a 475-year seismic event, but, in that event, all train activity on the LOSSAN would stop and the potential of a train being in the exact location of the track adjacent to the overdredge pit during a 475-year seismic event is highly unlikely.

Any utilities that pass through or near the overdredge pit area, such as the Solana Beach sewer pipe or electrical lines would be identified and coordination with the appropriate utility provider would occur as further described in Section 3.14.

While it is not possible to fully eliminate all risk associated with natural seismic events, the size of event that would have to occur during the several-month period of an empty overdredge pit along with the specific timing of a train on the track adjacent to the overdredge pit renders the possibility of resulting hazards very low. The very low risk of this significant seismic event, combined with the short period when the pit would be empty (2 to 3 months) and adequate distance between the overdredge pit and railroad embankment (to minimize the potential for structural damage if soils were to become unstable), **result in the potential risk for geologic hazards to be considered at an acceptable level that would be less than significant (Criteria A and C). No substantial adverse impacts would occur.**

Long-term maintenance would include dredging of the inlet and subtidal/sedimentation basin. Adaptive management may result in channel maintenance or refinements in the future. However, no permanent structures would be built in the lagoon. Because the removal and or placement of sediment and other material from the generally flat lagoon basins would not occur in locations that provide stability for other natural features such as slopes or hillsides, the removal of materials for restoration and ongoing maintenance purposes would not create increased slope instability, landslides, or other adverse geologic hazards. No change to existing soil types would result as the project does not involve import of fill materials. **A less than significant direct or**

indirect impact would result due to increased slope instability, landslides, or other adverse seismic-induced geologic hazards (Criteria A and C).

Lagoon restoration activities would typically be performed during dry weather conditions but within wet or fairly saturated soil conditions. As dredging would largely be confined to the interior lagoon areas and within the channels, the exposure and potential for erosion would be limited. Dredging activities would occur within areas that have been diked off and flooded to support the water depth necessary for the dredge. This would confine the area of turbidity caused by dredging activities to a limited area and disturbed sediments would have opportunity to settle out within the diked area prior to release of flood waters. Additionally, the type of dredging proposed (hydraulic cutterhead suction) is not the type that generates significant turbidity (such as a clamshell dredge). Further, particularly during construction of the overdredge pit and areas closer to the ocean (west and central basins) material being dredged would have a larger grain size, would settle relatively quickly, and would not migrate to areas of concern (e.g., tidal inlet). For these reasons, turbidity associated with the dredging activities would not be of the magnitude or severity to cause substantial effects. See Section 3.4 Water and Aquatic Sediment Quality for a discussion of turbidity impacts relative to water quality.

Prior to dredging, the lagoon would be temporarily inundated. This process would not result in high-velocity water flow or other factors that typically cause erosion or sedimentation, and no substantial erosion or other adverse geologic hazards would occur within the temporarily elevated water line. Project-specific permit(s) would be required under the NPDES Permit to the County for the MS4s implemented by the County's Watershed Protection Ordinance (WPO), and to the RWQCB for the California Construction General Permit implemented by a project-specific SWPPP (PDF-25). The County's permit requires a Stormwater Management Plan (SWMP), a Hydromodification Management Plan, and low-impact development BMPs to eliminate pollutants from leaving the project/construction site and to require project operations to eliminate any added downstream sedimentation or runoff. The state-required SWPPP mandates the implementation of sediment- and erosion-control BMPs in construction and post-construction phases to minimize impacts on surface drainage patterns and the amount of surface runoff.

Also, PDF-27 requires that turbidity be actively managed by using a cutterhead dredge and/or temporarily closing the lagoon inlet to minimize release of sediment to the coast, as well as capping the overdredge pit with sand material to encapsulate material and prevent it from being introduced into the water column to minimize release of disturbed material that could cause sedimentation or turbidity.

Wind erosion would be negligible due to the saturated soil conditions, and minor bank erosion (caused mostly by rainfall) would mostly be captured within the lagoon interior tributaries.

Natural erosion is an expected process with dredging projects as it contributes to softening the sculpted or scarified surfaces caused by dredging activities. This, along with acceptable sloughing and rounding of underwater contours, would be part of the naturalizing process as the lagoon's affected areas respond and regain a natural appearance following construction. **For the reasons outlined above and with implementation and maintenance of appropriate BMPs and PDFs, erosion and sedimentation potential would be properly managed in the lagoon basin, and direct or indirect geologic impacts would be less than significant (Criteria A and B). No substantial adverse impacts would occur.**

Access roads and staging areas located at the lagoon edges would be on drier upland areas where ground surface disturbance would have a greater potential for erosion. Generally, disturbance associated with upland access roads and staging area preparation and use would include some amount of vegetation clearing, grading, and/or fill with earth and gravel to accommodate construction and maintenance vehicles, equipment, and materials. Ground disturbance in these upland areas with drier soils and more varied topography would be susceptible to wind and water erosion and resulting downgradient sedimentation. However, as described in Section 3.2 Hydrology, project-specific permits would be required under the County and state NPDES Permits. BMPs would be developed specifically for the conditions of each access road or staging area location, and could include measures such as vegetated drainage swales, requirements to cover and secure earthen stockpiles, use of runoff dissipaters, use of gravel or other ground covers, and other appropriate erosion-control measures (PDFs 25 and 26). **With the implementation and maintenance of mandated BMPs, erosion and sedimentation potential would be managed in the upland areas, and related direct or indirect geologic impacts would be less than significant (Criteria A and B). No substantial adverse impacts would occur.**

Alternative 2A would improve tidal flow by constructing a new, more stable lagoon inlet south of the existing inlet. A Tidal Inlet Stability Study was prepared for the project to analyze the proposed tidal inlet concept for their stability (M&N 2012c). Based on its findings, the study recommended moving forward with the proposed concept design tidal inlet dimensions for each alternative. As recommended by the study, periodic dredging to remove sand and short and low CBFs have been incorporated into the project for Alternative 2A to increase inlet stability by reducing cobble input into the inlet. As described in Section 2.10.12, a long-term maintenance program is proposed as part of the project and would be included as part of the restoration plan. CBFs would be constructed on either side to block cobble from entering the lagoon to the extent possible and minimize maintenance costs to eventually remove the cobble. These features would also minimize the potential for the inlet to experience substantial erosion due to tidal flow and scouring, and wave-induced scour by blocking direct wave impact on bridge abutments. **CBFs would help to minimize potential erosion-related soil instability and would not create**

additional geologic hazards. Lagoon turbidity would be actively managed by temporarily closing the lagoon inlet, which would minimize released sediment along the coast and allow settlement of materials (PDF-27). Direct or indirect impacts to geologic resources would not be substantially adverse and would be less than significant (Criterion B).

Under Alternative 2A, a new Coast Highway 101 bridge would be built to span the new inlet location. Construction of this bridge would potentially occur within soil types subject to liquefaction, erosion, settlement, or other unstable geologic conditions, and this would be a potentially significant CEQA impact. Although the bridge would be designed in accordance with applicable current state and federal guidelines that address geologic hazards, seismic codes, geotechnical conditions, and loading criteria (PDF-38), mitigation would be required. Alternative-specific geotechnical studies are required to engineer the final pile and foundation design and establish whether piles would be driven to bedrock. The size and number of piles would be determined at the time of design and could use the friction from the pile surface to counter the loading. Seismic-induced liquefaction would have the highest potential to occur at the bridge abutments, where the fill material next to the bridge could liquefy if not appropriately treated with site-specific measures such as vibro-replacement (rock columns), cement mixing, or installing several shallow piles.

The channel under the new I-5 bridge planned by Caltrans would require substantial deepening for improved hydraulics (from 0.74 to -6.5 feet NGVD), and a new NCTD bridge structure would be constructed by NCTD with a channel extending beneath it as part of the LOSSAN double-tracking project. The channel deepening also may enter potentially liquefiable alluvial units, requiring mitigation and armoring at the bridge footings to minimize potential for scour and erosion of the new channel. **Thus, direct or indirect impacts related to the exposure of people or structures to increased risk due to seismically induced ground shaking causing liquefaction, settlement, ground rupture, lateral spreading and damage, or other geologic hazard would result in a potentially significant geologic hazard impact under CEQA (Criteria A and C). No substantial adverse impacts would occur under NEPA due to engineering codes, regulations, and requirements that would be met.**

The lagoon is a unique geologic feature in that it is rare and it is the mouth of Escondido Creek. The topography of the project area, which is the lagoon surface and inundated area, is generally level. Steep bluffs, which also qualify as a unique geologic feature, border portions of the lagoon to the north and south. These bluffs are outside of the construction area and would not be modified or changed by the project. No actions of the project within the lagoon basin would result in adverse changes to the geology or stability of the bluffs. The restoration project includes actions within the lagoon that would enhance the long-term viability of the lagoon's unique geology as a tidally influenced estuary. **A less than significant direct or indirect impact would**

result (Criteria A and B). No substantial adverse effect would occur to unique geologic or physical features being altered or destroyed through restoration or ongoing maintenance activities (Criterion D).

Alternative 1B

Similar to Alternative 2A, restoration activities and ongoing maintenance within the lagoon would require excavation of large quantities of material, approximately 1.2 mcy, from the lagoon basins and tidal channels. The extent of dredging and other ground disturbance for Alternative 1B can be seen in Figure 2-13 and conceptual slopes and terrain modification would be similar to that described for Alternative 2A. Also, dredging activities would occur within areas that have been diked off and confine the area of turbidity, the disturbed sediments would have opportunity to settle out within the diked area prior to release of the flood waters, the type of dredging proposed does not generate substantial turbidity, and the type of material being dredged would be of a grain size that settles out of the water column relatively quickly, particularly near the inlet. See Section 3.4 Water and Aquatic Sediment Quality for a discussion of turbidity impacts relative to water quality.

As with Alternative 2A, an overdredge pit is proposed in the design. The overdredge pit was specifically designed with appropriate distance from the NCTD railroad embankment so that, even if the pit unexpectedly collapsed, the railroad embankment stability would be unaffected. At the currently designed side slopes of 5:1, there would be a distance of approximately 145 feet from the top edge of the overdredge pit to the railroad embankment toe, and a distance of approximately 350 feet from the overdredge pit toe to the railroad embankment toe. The proposed 2:1 (horizontal to vertical) railroad embankment fill slope would be covered with riprap. The presence of the dredge pit should not cause lateral slope stability or deformation of the 2:1 fill embankment (Ninyo & Moore 2014). If the overdredge pit slope were to become unstable during a strong earthquake, there would be sufficient distance between the overdredge pit and the railroad berm to preclude impacts to the berm from the pit. The potential for seismically induced lateral spread into the dredge pit is considered negligible (Ninyo & Moore 2014).

While it is not possible to fully eliminate all risk associated with natural seismic events, the size of event that would have to occur during the several-month period of an empty overdredge pit along with the specific timing of a train on the track adjacent to the overdredge pit renders the possibility of resulting hazards very low. As described for Alternative 2A, the very low risk of this significant seismic event, combined with the short period when the pit would be empty (2 to 3 months) and the adequate distance between the overdredge pit and railroad embankment (to minimize the potential for structural damage if soils were to become instable) **result in the**

potential risk for geologic hazards to be considered at an acceptable level that would be less than significant (Criteria A and C). No substantial adverse impacts would occur.

Because the removal and/or placement of sediment and other material from the generally flat lagoon basins would not occur in locations that provide stability for other geologic formations or natural features such as slopes or hillsides, the removal of materials for restoration and ongoing maintenance purposes **would not create increased slope instability, landslides, or accelerated erosion. A less than significant direct or indirect impact would result (Criteria A and B). No substantial adverse effect would occur.**

Alternative 1B would retain the existing Coast Highway 101 bridge and would seismically retrofit the existing structure due to the current seismic safety deficiencies, as described under existing conditions. The bridge retrofit activities would not exacerbate or increase geologic risk, but would reduce risk caused by the existing seismic deficiency of the bridge (M&N 2013). **Final retrofit design for the bridge would be reviewed by appropriate regulatory agencies (such as the City of Encinitas and Caltrans) prior to construction, and would adhere to existing laws and regulations. Impacts would be less than significant as related to the exposure of people to increased risk due to seismically induced ground shaking causing liquefaction, settlement, ground rupture, lateral spreading and damage, or other geologic hazard owing to the Coast Highway 101 bridge retrofit (Criterion C). No substantial adverse impacts would occur.**

Channels underneath the existing Coast Highway 101, I-5, and NCTD railroad bridges would require substantial deepening (by approximately 5 feet, 7 feet, and 6 feet, respectively) for improved hydraulics and necessitate appropriate design standards and protection. Analyses conducted for the SELRP indicate that no increase in scour depth would occur under the bridge from channel deepening. This means that channel deepening would occur in materials that are resistant to scouring and that the hydraulics of the channel flow would be stable and non-erosive at its depth. This conclusion is supported by the bedrock sill existing west of the bridge (M&N 2013). The hydraulic analyses of cross-sections of the existing Coast Highway 101 bridge indicate that, for Alternatives 1A and 1B, the hydrology over time would widen rather than deepen the channel to convey greater tidal flow volumes (M&N 2013). For the reasons described above and detailed in the December 2013 Memorandum addressing Highway 101 Bridge over San Elijo Lagoon (Cr No. 57C-0210) – Seismic Retrofit (M&N 2013), the existing seismic deficiencies of the Coast Highway 101 bridge would not be affected by implementation of Alternative 1B.

The channel deepening and resulting protection design would be engineered in accordance with applicable current state and federal guidelines (such as the UBC, CBC, regulations required by

Caltrans' Division of Design and/or Division of Engineering Services, and/or engineering standard/code compliance with the City of Encinitas) that are required to address erosion hazards, seismic codes, geotechnical conditions, and loading criteria. As described at the start of this analysis, each appropriate reviewing entity would review and verify that structural stability standards are met. These structural regulations are designed to reduce geologic hazards to the fullest extent through structure and site-specific engineering; thus, adherence to applicable codes, requirements, and regulations would minimize potential geologic risk associated with bridge work. **Impacts would be less than significant as related to the exposure of people to increased risk due to seismically induced ground shaking causing liquefaction, settlement, ground rupture, lateral spreading and damage, or other geologic hazard owing to channel deepening activities associated with each of the bridges (Criterion C). No substantial adverse impacts would occur.**

Similar to the discussion provided for Alternative 2A, a project-specific SWMP (with a Hydromodification Management Plan and low-impact development) and SWPPP would be developed that mandates the implementation of construction and post-construction sediment and erosion control BMPs (PDF-25). BMPs could include measures such as vegetated drainage swales, requirements to cover and secure earthen stockpiles, use of runoff dissipaters, use of gravel or other ground covers, and other appropriate erosion control measures. Specific BMPs would be developed once the project alternative has been selected through the permitting process with review and approval by the RWQCB for the SWPPP and the County for the SWMP to ensure that the BMPs would be the most effective and minimize potential for sedimentation and erosion, **The potential for increased erosion, direct or indirect destruction of a unique geologic or physical feature, or other resulting geologic hazards would not be substantially adverse and would remain less than significant (Criteria A, B, C, and D).**

Alternative 1A

Restoration activities and ongoing maintenance within the lagoon would require excavation of material, approximately 160,000 cy, from the lagoon basins and tidal channels. The extent of dredging and other ground disturbance for Alternative 1A can be seen in Figure 2-14. Because this alternative does not use an overdredge pit and results in the removal and/or placement of sediment and other material from the generally flat lagoon basins, it **would not create increased slope instability, landslides, or other geologic hazards. No substantial adverse impacts would occur, and a less than significant direct or indirect impact would result (Criteria A and B).**

As described for Alternative 1B, Alternative 1A would also retain and retrofit the existing Coast Highway 101 bridge and would require deepening of channels underneath the existing Coast

Highway 101, I-5, and NCTD railroad bridges. The existing bridge structure on Coast Highway 101 would be seismically retrofitted. The other existing bridges would need appropriate protection. The bridge retrofit and channel excavations would not exacerbate or increase geologic risk caused by the existing seismic deficiency of the bridge (M&N 2013). Analyses conducted for the SELRP indicate that scour depth would not be increased under the bridge from channel deepening and the cross-section under existing Coast Highway 101 bridge would widen rather than deepen to convey greater tidal flow volumes (M&N 2013). Thus, the existing seismic deficiencies of the Coast Highway 101 bridge would not be affected by implementation of Alternative 1A. The deepening and resulting protection design would be engineered in accordance with applicable current state and federal guidelines (such as the UBC, CBC, regulations required by Caltrans' Division of Design and/or Division of Engineering Services, and/or engineering standard/code compliance with the City of Encinitas) that are required to address geologic hazards and must consider seismic codes, geotechnical conditions, and loading criteria. As described at the start of this analysis, each appropriate reviewing entity would review and verify that structural stability standards are met. These structural regulations are designed to reduce geologic hazards to the fullest extent through structure and site-specific engineering; thus, adherence to applicable codes, requirements, and regulations would minimize potential geologic risk associated with bridge work. **Impacts would be less than significant as related to the exposure of people to increased risk due to seismically induced ground shaking causing liquefaction, settlement, ground rupture, lateral spreading and damage, or other geologic hazard owing to channel deepening activities associated with each of the bridges (Criterion C). No substantial adverse impacts would occur.**

Similar to the discussion provided for Alternative 2A, project-specific SWMP (with Hydromodification Management Plan and low-impact development) and SWPPP would be developed that mandate the implementation of construction and post-construction sediment and erosion control BMPs (PDF-25). BMPs could include measures such as vegetated drainage swales, requirements to cover and secure earthen stockpiles, use of runoff dissipaters, use of gravel or other ground covers, and other appropriate erosion control measures. Specific BMPs would be developed once the project alternative has been selected through the permitting process with review and approval by the RWQCB for the SWPPP and the County for the SWMP to ensure that the BMPs would be the most effective and minimize potential for sedimentation and erosion. T**he direct or indirect potential for increased erosion, destruction of a unique geologic or physical feature, or other resulting geologic hazards would not be substantially adverse and would remain less than significant due to implementation of Alternative 1A (Criteria A, B, C, and D).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in modifications to the lagoon and there would be no adverse change to geologic conditions or resources. **No impact would result (Criteria A, B, C, and D).**

Materials Disposal/Reuse

It is anticipated that material placed as part of materials disposal/reuse could be deposited on existing beaches and the ocean floor, and would ultimately be spread alongshore, cross-shore, and across the ocean floor through natural littoral transport.

The SAP (Appendix A) has been reviewed by EPA and the Corps. Initial SAP work involved analysis of materials for suitability for placement on the beach, in the nearshore zone, at offshore former SANDAG borrow sites and into the proposed overdredge pit in the lagoon for Alternatives 1B and 2A. The analysis indicated that materials excavated from the overdredge pit location (Alternatives 2A and 1B) are likely to be suitable for placement on beaches or in the nearshore. Additional evaluation of the preferred alternative and placement option with these agencies would be required to obtain a final compatibility determination.

Preliminary soil investigations included in the SAP also suggest the material would be suitable for disposal at LA-5 as proposed in Alternative 1A; however, a formal determination from EPA and the Corps would be required prior to disposal. Discussions in the SAP regarding offshore disposal at LA-5 occurred for background and to understand its capacity limitations, but formal submittals requesting authorization to place sand would be made upon selection of a final alternative. If disposal at LA-5 were part of the selected alternative, then supplemental Tier 3 analysis would be required.

Alternative 2A

<u>Offshore Stockpiling</u>

Seismic activity occurring at offshore locations, such as SO-5 and SO-6, or nearshore at Cardiff would not result in typical geologic hazards generally associated with onshore locations, such as ground failure or liquefaction. Offshore seismic activity would be more likely to result in hazards such as ocean waves or a tsunami, rather than geologic hazards that could directly or indirectly affect people or structures. The placement of materials at offshore locations would not increase or create potential for geologic conditions that could expose people to seismically induced adverse geologic hazards and impacts to seismically induced ground shaking, ground rupture, and liquefaction. **There would be no impact (Criterion C). No substantial adverse effects would occur.**

Sand placed at offshore locations outside the depth of closure (SO-5, SO-6, and LA-5) would not be substantially affected by sand transport processes as described in Section 3.3 Oceanography/Coastal Processes. **No impacts to slope instability, landslides, or substantial erosion would occur (Criteria A and B). No substantial adverse effects would occur.**

The placement of materials at offshore locations would be below the surface of the ocean and in areas designated for and currently used as materials disposal/placement locations. Thus, no unique geologic feature would be destroyed by offshore materials placement and **no impact would result (Criterion D). No substantial adverse effects would occur.**

<u>Nearshore</u>

People in the nearshore are typically in boats or personal watercraft. The placement of materials on the ocean floor at nearshore locations would not increase or create potential for geologic conditions that could expose people to seismically induced geologic hazards. **There would be no substantial adverse impacts associated with seismically induced ground shaking, ground rupture, or liquefaction at this location. Impacts would remain less than significant (Criterion C) and no substantial adverse effects would occur.**

The addition of structures along the shoreline within a littoral cell can modify littoral processes in that cell, and can affect beach width by increasing erosion or beach sand loss from onshore. To minimize shoreline changes in the vicinity of the new inlet, Section 3.3 Oceanography/Coastal Processes discussed the creation of a prefilled ebb bar. Construction of the ebb bar at this location simultaneously with the new inlet would prevent excessive erosion at Cardiff State Beach. The remainder of materials placement is intended to supplement material in the littoral system and would not affect erosion patterns at area beaches. In fact, onshore placement would be a benefit in the near term. **No significant impacts to slope instability, landslides, and substantial erosion are anticipated (Criteria A and B). No substantial adverse effects would occur.**

Similar to the discussion of offshore placement, the placement of materials within the nearshore would be below the surface of the ocean. Thus**, no unique geologic feature would be destroyed by offshore materials placement and no impact would result (Criterion D). No substantial adverse effects would occur.**

<u>Onshore</u>

For proposed onshore materials placement sites, seismic activity associated with the Rose Canyon or other nearby faults may lead to liquefaction, ground failure, sand volcanoes, or seaward slumping of beach material. These conditions exist currently, and the placement of additional material onshore in the proposed locations would not affect these processes. The adverse direct or indirect exposure of people or structures to seismically induced ground shaking causing liquefaction, settlement, ground rupture, or lateral spreading and damage would not be affected by onshore materials placement, and **impacts to seismically induced ground shaking, ground rupture, and liquefaction would be less than significant (Criterion C). No substantial adverse impacts would occur.**

The placement of sand at onshore locations, such as the proposed beach sites, would not cause geologic hazards as a result of ground instability or erosion. Placed material would supplement existing beach material that already exists in these locations. The placement of materials at some onshore locations may reduce the potential for geologic hazards as it would protect against the undercutting or erosion of cliffs or other areas subject to wave-induced erosion, thus reducing slope instability and landslide potential. As discussed in Section 3.3 Oceanography/Coastal Processes, littoral transport in the Oceanside Littoral Cell causes sand movement onshore/offshore, as well as alongshore, depending on seasonal and annual variations in wave direction and energy. Beaches in the project study area tend to be relatively narrow and backed by bluffs or infrastructure (e.g., roads, restaurants), with slightly wider sand platforms in summer compared to winter. Materials placed at the proposed onshore locations would eventually be moved as part of the littoral cell process but would not increase or accelerate this natural sand transport process. **No substantial adverse impacts to slope instability, landslides, and substantial erosion are anticipated, and impacts would remain less than significant (Criteria A and B)**.

Beaches in the study area are typically overlain by a layer of sand varying in thickness depending on the littoral processes described in Section 3.3 Oceanography/Coastal Processes. Sand bar thickness in the nearshore areas adjacent to littoral zone placement sites may increase temporarily with the placement of additional material in the system. The material would remain in the mobile overlying layer of the littoral zone and would not affect the underlying geologic characteristics of the region. Material proposed for reuse (e.g., in the location of the overdredge pit in the central basin) has been confirmed to be compatible with existing sand in the system and would not affect the overall characteristics of the littoral cell.

Alternative 1B

Materials placement for Alternative 1B is similar to that proposed for Alternative 2A. Sand placement at area beaches, in the nearshore, and in the offshore, as described for Alternative 2A, could still occur. Material placement would supplement sand already in the system and would not increase erosion along the coastline. Similar to Alternative 2A, **less than significant impacts to geology/soils would occur (Criteria A, B, C, and D). Impacts would not be substantially adverse.**

Alternative 1A

Under Alternative 1A, minimal beneficial reuse of material is anticipated. The majority of material would be exported offshore to the current approved ocean disposal site at LA-5 for disposal with a small volume being reused on-site for the nesting and transitional areas. Material deposited in LA-5 may redistribute slightly over time due to water currents but is anticipated to remain relatively undisturbed due to its depth and location outside of the littoral zone. The placement of materials at LA-5 would be below the surface of the ocean and in an area designated for, and currently used as, a materials disposal/placement location, with no adverse effects to geologic hazards or features. While initial testing suggests the material would be suitable for disposal at LA-5, supplemental Tier 3 analysis would be conducted to verify material meets criteria for LA-5 disposal prior to placement by EPA and the Corps in compliance with the ODM. **Less than significant impacts to geology/soils would occur (Criteria A, B, C, and D). No substantial adverse impacts would result.**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in nourishment of area beaches or the nearshore. **No adverse direct or indirect impacts to geologic conditions or resources would result, and no positive benefits to the littoral zone with respect to the sand nourishment identified as a component of the RSM Plan would occur (Criteria A, B, C, and D).**

3.5.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Impacts on geologic hazards from construction of the overdredge pit, tidal inlet, and bridge for Alternative 2A, and overdredge pit for Alternative 1B are less than significant due to project design features and engineering standards/codes that dictate design standards (such as the UBC, CBC, regulations required by Caltrans' Division of Design and/or Division of Engineering Services, and/or engineering standard/code compliance with the City of Encinitas), plus appropriate reviewing entities that ensure standards are met to avoid or minimize geologic impacts.

The following mitigation measures are required for CEQA significant impacts. Mitigation measure Geology-1 would be required under CEQA for implementation of Alternative 2A.

Geology-1 The proposed bridge improvement and channel-deepening portions of the project could result in significant impacts from liquefaction, erosion, settlement, and other unstable geologic conditions. The mitigation of performing geotechnical investigations and implementing site-specific measures recommended in the engineering study to ensure appropriate design for structural stability and reducing unstable geologic conditions is required to reduce impacts to less than significant. After implementation of the measures identified to remediate potentially unstable geologic conditions, certification shall be provided by a California Registered Professional Engineer or Certified Engineering Geologist that states that the measures are in place and the identified liquefaction, erosion, settlement, or other unstable geologic conditions have been adequately remediated to mitigate the potential impact.

Project design features also incorporate project engineering and design measures necessary to meet regulatory requirements and standards to ensure geologic safety. Project design features addressing geologic hazards include implementation of an approved SWMP, Hydromodification Management Plan, and low-impact development BMPs to eliminate pollutants from leaving the project/construction site and to require project operations to eliminate any added downstream sedimentation or runoff, and implementation of a state-required SWPPP for sediment and erosion control BMPs in construction and post-construction phases with BMPs to minimize impacts on surface drainage patterns and the amount of surface runoff. In addition, active management of the tidal inlet to allow for settlement of sediments and minimization of release of disturbed sediment to the ocean, pile and abutment design requirements, and incorporation of recommendations related to sea level rise from SANDAG would be required. Mitigation and project design features have been incorporated throughout the project to minimize and avoid geologic hazards.

3.5.5 Level of Impact after Mitigation

CEQA: Potential impacts related to geology/soils would be mitigated to less than significant.

NEPA: No substantial adverse direct or indirect impacts associated with geology and soils have been identified due to implementation of the SELRP.

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3.6 BIOLOGICAL RESOURCES

Information in this section is derived from three key sources: the Biological Resources Technical Report (BTR) focusing on the lagoon (Appendix F), a Jurisdictional Delineation Report or JDR (Appendix G), and a Biological Technical Report addressing disposal and nearshore marine resources (Appendix H). Substantial data have been collected by a wide variety of technical specialists regarding biological resources in the lagoon over the past decade, including monthly bird counts, sensitive species surveys, invertebrate and fish surveys, and vegetation surveys. This information is incorporated into the BTR as well as this section.

This evaluation was drafted to satisfy CEQA and NEPA requirements, as well as support preparation of the 404(b)(1) alternatives analysis and DA permit. Subsequent to CEQA/NEPA approval, and the Corps determination of the final LEDPA, it is anticipated that USFWS would amend the Biological Opinion for the I-5 North Coast Corridor Project or issue a project specific Biological Opinion through the Section 7 consultation process (USFWS 2012a).

This evaluation is based on findings from previously conducted surveys, plus surveys and research by AECOM and Merkel & Associates biologists. The LA-5 disposal site is a permitted disposal site and has been evaluated in an approved EIS (EPA 1987) and material would be placed consistent with EPA-mandated conditions for use. Thus the biological conditions associated with this offshore location and impacts associated with disposing of material into this site have been evaluated. In addition, material proposed for disposal at LA-5 would be required to comply with quality requirements for that site. Preliminary coordination with the Corps and EPA has indicated that the material appears to be suitable for disposal at LA-5. If Alternative 1A is selected for implementation, additional testing (e.g., Tier 3 testing) would be required to obtain final authorization for disposal. Potential biological impacts from disposal at LA-5 are not discussed further.

3.6.1 AFFECTED ENVIRONMENT

The SELRP restoration project is driven by the need to modify the existing lagoon hydrology and prevent further degradation to physical and biological functions of the lagoon (Section 1.2). Restoration would also result in direct changes to the lagoon and to specific sites where excavated materials may be disposed of and/or reused. This section provides separate descriptions of both study areas: the lagoon and the various materials disposal/reuse sites (offshore, nearshore, and onshore). The lagoon study area is referred to as the Biological Study Area (BSA) throughout this section and includes the approximately 960-acre San Elijo Lagoon. The materials disposal/reuse study area discussion addresses beach, and nearshore and offshore areas that may be affected by materials disposal.

San Elijo Lagoon Biological Study Area

San Elijo Lagoon is a coastal estuary that represents a unique ecosystem where marine and terrestrial ecosystems meet. The lagoon currently supports a variety of habitats and a diverse suite of plants and wildlife, including more than 300 species of plants, more than 20 species of fish, more than 20 species of reptiles and amphibians, 24 species of mammals, and more than 295 bird species (including 65 nesting), in addition to a complex community of terrestrial and marine invertebrates.

San Elijo Lagoon receives salt water from the Pacific Ocean and freshwater from a 77-square-mile watershed with two main tributaries, Escondido Creek and Orilla Creek. For the estuarine environment to be highly productive, it must be continually replenished with water and nutrients from the ocean, as well as periodic pulses of freshwater associated with the fluvial processes and rainfall.

The relationship between freshwater inflows and salt marsh dynamics is complex. Timing and duration of freshwater inflows can result in a broad range of effects that correlate with the degree of change in soil salinity. The timing of freshwater inflows, the amount of freshwater, and the inflow duration plays an important part in the response of the normally hypersaline salt marsh.

Regular tidal action also provides high water quality, prevents extreme fluctuations in salinity and temperature, and maintains high levels of dissolved oxygen. Due to existing constraints on the lagoon ecosystem, including regular mouth closures, high-nutrient sediments, impounded freshwater and salt water, muted tides, and poor circulation, San Elijo Lagoon is functioning in a degraded state. Improvement of the hydraulic efficiency of the lagoon through widening and creation of new channels proposed under the SELRP restoration alternatives would allow for periodic, short-term freshwater pulses while managing potentially damaging long-term salinity reduction.

Vegetation Communities

Vegetation communities are assemblages of plant species that usually coexist in the same area and provide habitat for wildlife species. The classification of vegetation communities is based upon the life form of the dominant species within that community and the associated flora. Field surveys were performed by AECOM in spring 2010 and 2012. Accordingly, three generalized categories characterize the land cover types observed during vegetation mapping: riparian and other wetlands, uplands, and other cover types. Within these three categories are 10 riparian and wetland communities, six upland communities, and three other cover types (Figures 3.6-1 and 3.6-2). The acreages of each vegetation community and cover type within the BSA are provided

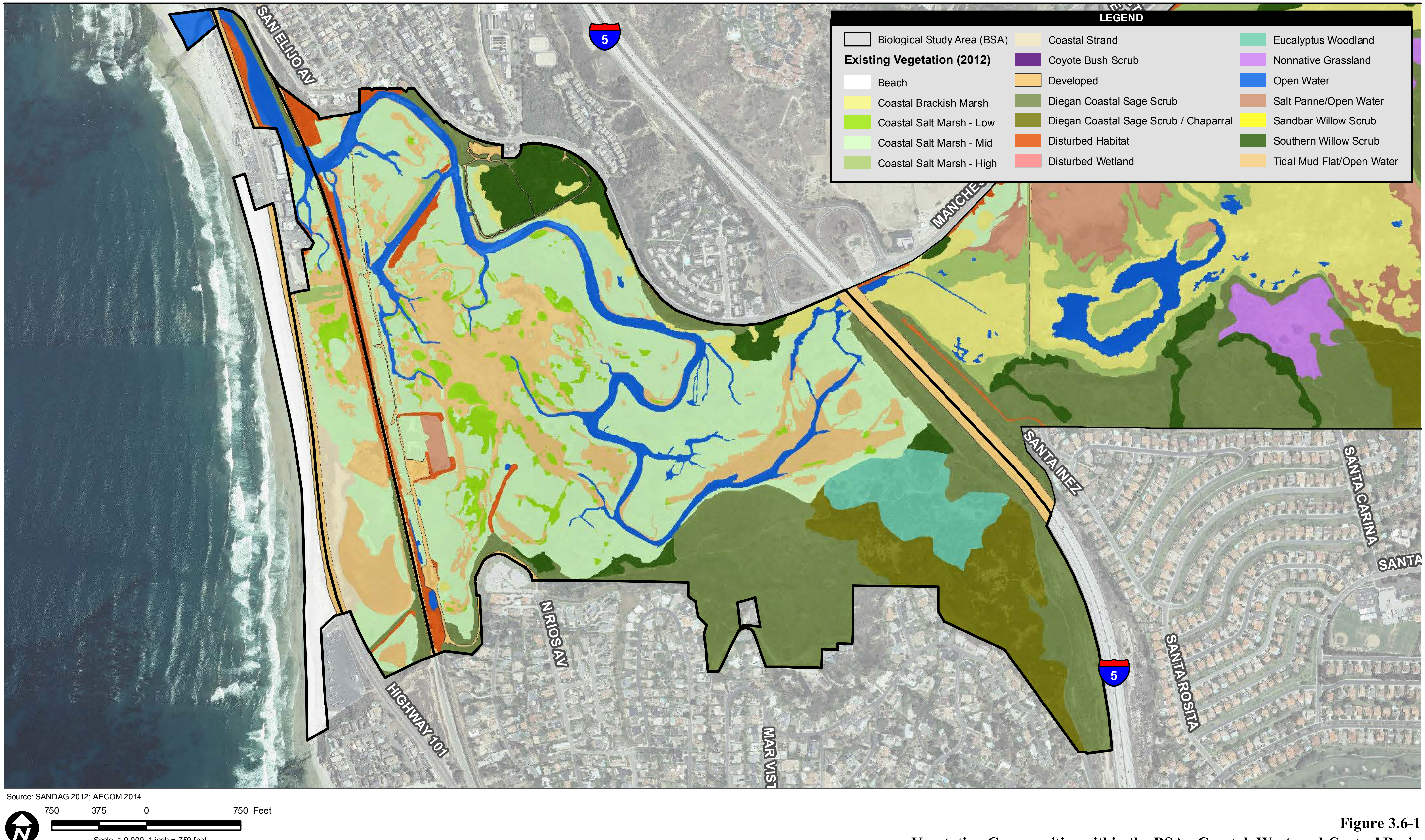

Figure 3.6-1
Vegetation Communities within the BSA - Coastal, West, and Central Basin

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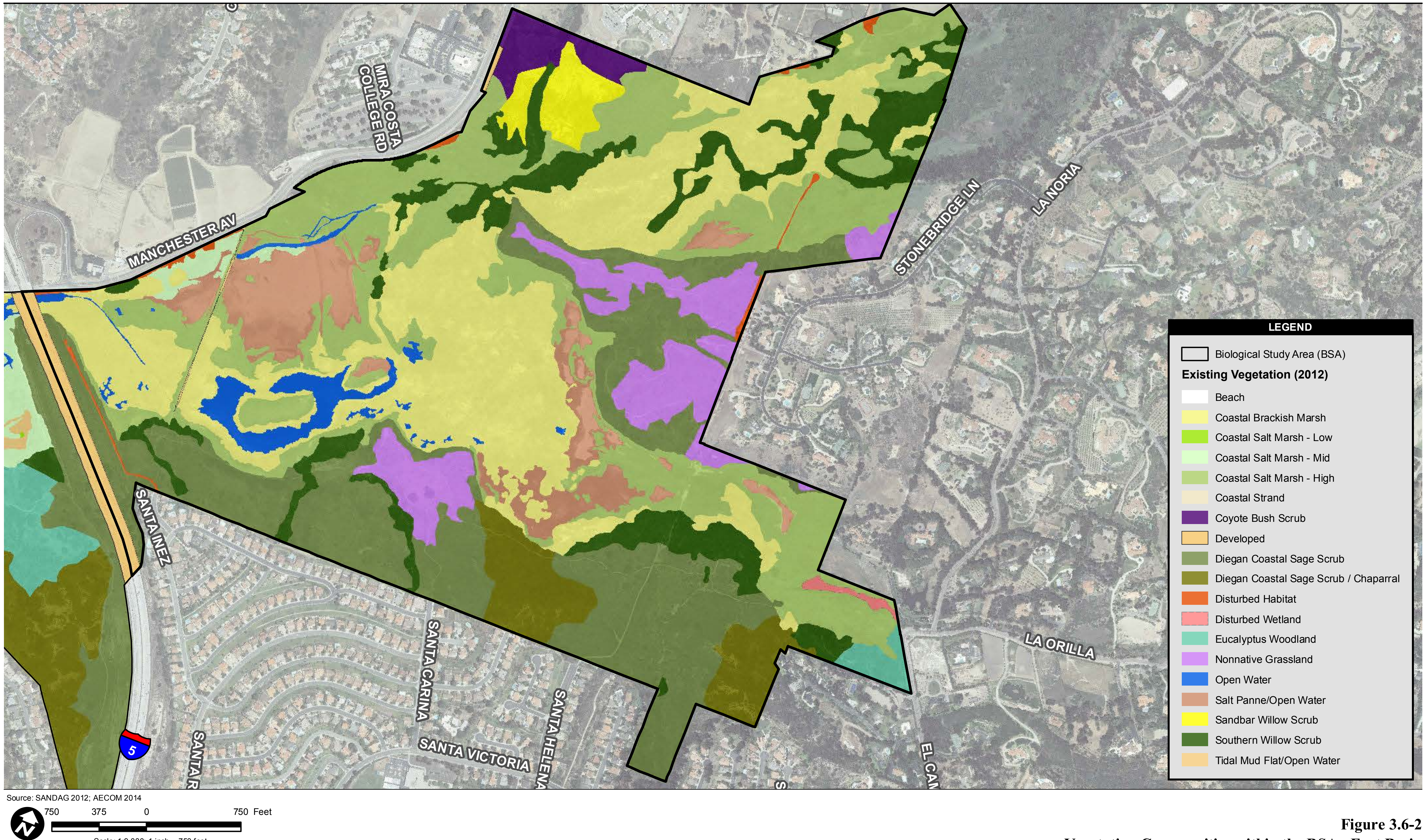

Figure 3.6-2
Vegetation Communities within the BSA - East Basin

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in Table 3.6-1. All of the vegetation communities and land cover types identified are considered sensitive, with the exception of eucalyptus woodland, developed areas, and disturbed habitats, due to their ecological function and ability to support sensitive species. For a complete description of each vegetation community, refer to the BTR in Appendix F.

Table 3.6-1
Vegetation Communities and Other Cover Types within the Survey Area (Acres)

Vegetation Communities and Other Cover Types[1]	Coastal Area	West Basin	Central Basin	East Basin	Total
Riparian and Wetlands					
Coastal Brackish Marsh			6.1	125.4	131.5
Coastal Salt Marsh – High Littoral Zone		0.8	0.7	118.5	120.0
Coastal Salt Marsh - Mid Littoral Zone		16.7	121.3	3.4	141.4
Coastal Salt Marsh - Low Littoral Zone		1.5	11.8		13.3
Disturbed Wetland[2]				1.1	1.1
Open Water (Tidal Channels & Basin)	1.5	4.3	23.7	10.6	40.1
Salt Panne/Open Water			1.5	35.4	36.9
Sandbar Willow Scrub[2]				9.0	9.0
Southern Willow Scrub[2]			14.4	47.0	61.4
Tidal Mud Flat/Open Water		13.8	49.3		63.1
Subtotal Riparian and Wetlands	***1.5***	***37.1***	***228.8***	***350.4***	***617.8***
Uplands					
Coyote Bush Scrub				7.5	7.5
Diegan Coastal Sage Scrub		3.1	67.0	108.0	178.1
Diegan Coastal Sage Scrub/Chaparral			27.7	21.6	49.3
Eucalyptus Woodland			15.7	3.4	19.1
Nonnative Grassland				33.0	33.0
Subtotal Uplands	***0***	***3.1***	***110.4***	***173.5***	***287.0***
Other Cover Types					
Beach	15.0				15.0
Coastal Strand		5.0			5.0
Developed (Berm Roads)	3.0	5.2	10.4	4.9	23.5
Disturbed Habitat		2.5	6.7	2.6	11.8
Subtotal Other Cover Types	***18.0***	***12.7***	***17.1***	***7.5***	***55.3***
TOTAL	**19.5**	**52.9**	**356.3**	**531.4**	**960.1**

1 In accordance with the *Draft Vegetation Communities of San Diego County* (Oberbauer et al. 2008), based on the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986).
2 Disturbed Wetland, Sandbar Willow Scrub, and Southern Willow Scrub are combined into a riparian vegetation community when discussing impacts and alternatives.

Designated Critical Habitats

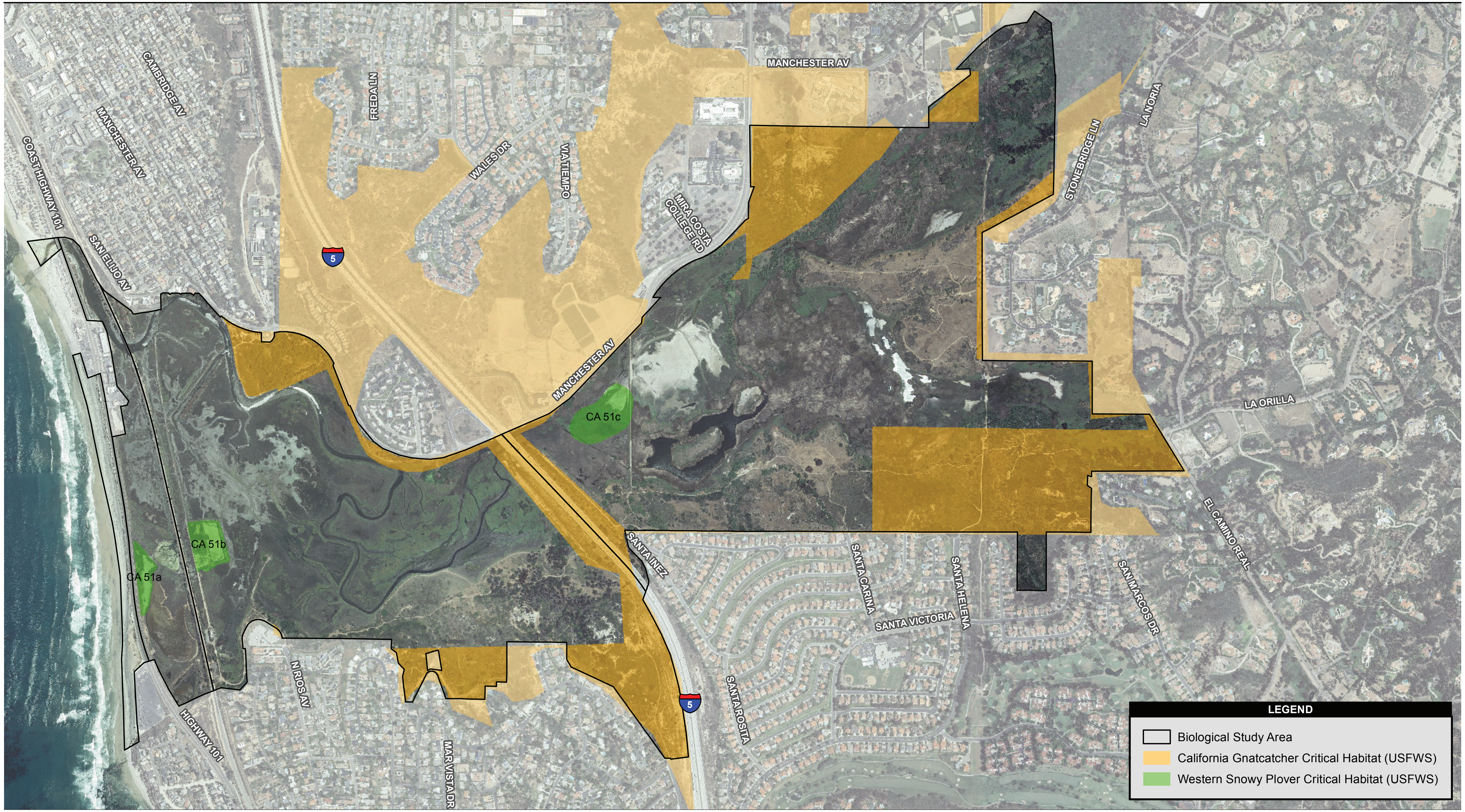
In addition to sensitive habitats, certain habitats receive special designation by USFWS and NMFS. Below is a discussion of designated critical habitats within the survey area.

USFWS Critical Habitat and Primary Constituent Elements

USFWS designates critical habitat for federally threatened and endangered species. It is a specific geographic area(s) that is essential for the conservation of a threatened or endangered species and that may require special management and protection. An area is designated as “critical habitat” after USFWS publishes final boundaries of the critical habitat area in the *Federal Register*. The areas shown on critical habitat maps are often large, but it is important to note that the entire mapped area may not be considered critical habitat. Only areas that contain the primary constituent elements (PCEs) required by the target species are considered critical habitat. PCEs are the elements of physical or biological features that, when laid out in the appropriate quantity and spatial arrangement to provide for a species’ life-history processes, are essential to the conservation of the species. PCEs may include, but are not limited to, (1) space for individual and population growth and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for breeding, reproduction, or rearing (or development) of offspring; and (5) habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species (USFWS 2011).

Of the federally listed species known to occur within San Elijo Lagoon, two have designated critical habitat mapped within the BSA, including the coastal California gnatcatcher and western snowy plover. Coastal California gnatcatcher critical habitat was originally proposed in 2000 and subsequently revised in 2007 by USFWS (72 FR 72009). Approximately 205 acres of coastal California gnatcatcher critical habitat occurs within the BSA, but it is primarily within the coastal sage scrub and chaparral upland habitats surrounding the lagoon (Figure 3.6-3). The coastal California gnatcatcher critical habitat within the BSA (205 acres) represents 1 percent of the 17,325-acre unit (Unit 3). PCEs for the California gnatcatcher include dynamic and successional sage scrub habitats that provide adequate space for population growth, normal behavior, breeding, reproduction, nesting, dispersal, and foraging. PCEs may also include non-sage scrub habitats (e.g., chaparral, grassland, and riparian areas) in proximity to sage scrub habitats that provide space for dispersal, foraging, and nesting.

Western snowy plover critical habitat was originally proposed in 1995 but was not finalized until 1999 (USFWS 1999). It was subsequently revised as part of the final rule in 2005 (USFWS 2005). In 2012, the critical habitat was once again updated and, at that time, approximately 15 acres was identified within San Elijo Lagoon and the BSA. The snowy plover critical habitat within the BSA represents 100 percent of the unit (Unit 51). The new designation of critical habitat within San Elijo Lagoon is a direct result of the SELRP restoration planning effort, and the identified critical habitat subunits for western snowy plover correspond to the potential future nesting sites identified in the restoration alternatives.



Source: SANDAG 2012; USFWS; AECOM 2014

1,100 550 0 1,100 Feet

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

Figure 3.6-3
Critical Habitat for California Gnatcatcher and Western Snowy Plover

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The critical habitat within the lagoon was divided into three potential nest sites or subunits, labeled CA 51A, CA 51B, and CA 51C (USFWS 2012b) (Figure 3.6-3). PCEs for western snowy plover currently exist on-site within these subunits, and include sandy beaches and tidally influenced estuarine mud flats (PCE 2) with tide-cast organic debris supporting small invertebrates (PCE 3). Although not discretely mapped by USFWS, the following four PCEs have the potential to occur within each of the three subunits, either individually or together:

- PCE 1 – Areas that are below heavily vegetated areas/developed areas and above the daily high tides
- PCE 2 – Shoreline habitat areas for feeding with no or very sparse vegetation that are between the annual low tide or low-water flow and annual high tide or high-water flow, subject to inundation but not constantly under water, that support small invertebrates that are essential food sources such as crabs, worms, flies, beetles, spiders, sand hoppers, clams, and ostracods
- PCE 3 – Surf- or water-deposited organic debris such as seaweed (including kelp and eelgrass) or driftwood located on open substrates that supports and attracts small invertebrates described in PCE 2, provides cover or shelter from predators and weather, and assists in avoidance of detection (crypsis) for nests, chicks, and incubating adults
- PCE 4 – Minimal disturbance from the presence of humans, pets, vehicles, or human-attracted predators and provide relatively undisturbed areas for individual and population growth and for normal behavior

At this time, these three subunits and PCEs associated with western snowy plover are in a degraded state and have not supported nesting plover since 2005. As noted in the Federal Register, restoration of degraded habitat within these three subunits will improve the habitat (USFWS 2012b).

No critical habitat for other federally listed species occurs within the BSA.

Essential Fish Habitat

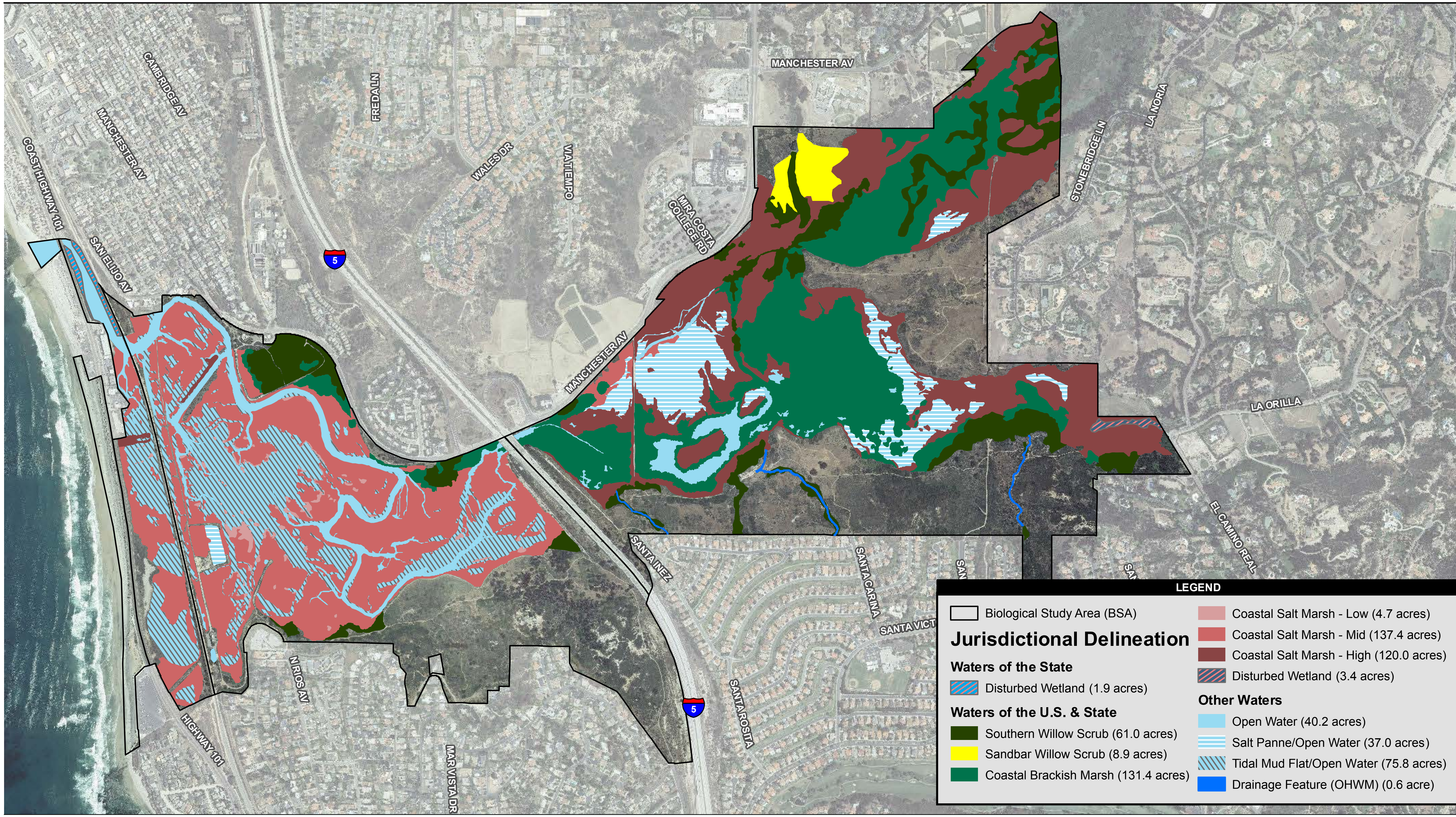
As described in the Regulatory Section in Section 1.5 and Appendix C, EFH is defined as those “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The coastal waters of southern California are designated as EFH, which are managed by NMFS. Estuaries are considered a Habitat Area of Particular Concern (HAPC), which is a subset of EFH. Estuaries (as mapped by NOAA) are considered an important habitat in the lifecycle of many fish as they often support the early larval and juvenile stages of development when adequate habitat structure is present. San Elijo Lagoon is mapped as EFH both for groundfish and as estuarine HAPC. As San Elijo Lagoon does not support substantial subtidal habitat, it is likely that the lagoon is currently not playing a critical role in sustaining nearshore fish populations. However, the connection of the protected open water and tidal channels in the lagoon to the open ocean may still play some role in supporting local fish populations.

When the lagoon mouth is open, the project area is likely suitable for four species of finfish, Pacific sardine, Pacific (chub) mackerel, northern anchovy, and jack mackerel; and market squid. Juvenile sardine and anchovy may venture into or be transported to the project area with tidal waters. Highly migratory species, such as tuna, swordfish, and sharks, are not expected to occur in the project area. Local populations of leopard shark and rays may be present as mudflats provide potentially suitable foraging habitat for these bottom feeding species.

Jurisdictional Waters and Wetlands

As described in detail in Appendix G, a jurisdictional delineation (including verified Preliminary Jurisdictional Determination form) was completed for the BSA in 2010. A total of 620.1 acres of potential jurisdictional waters and wetlands occurs within the BSA (Figure 3.6-4). Of these acres, 618.2 acres is considered potential waters of the U.S. and state. An additional 1.9 acres is considered potential waters of the state only.

Total jurisdictional waters of the U.S. and state are listed for each wetland habitat and other waters of the U.S. (in the form of wetlands, tidal waters, or nonwetland waters/ordinary high water mark) in Table 3.6-2. Vegetation is classified by habitat type using both the San Diego Regional Holland Code Classification System and *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). A summary of the jurisdictional waters of the U.S. and state, with the corresponding regulatory authority, occurring within the survey area, is provided in Table 3.6-3.



Source: SANDAG 2012; AECOM 2014

1,100 550 0 1,100 Feet

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

Figure 3.6-4
Jurisdictional Waters in BSA

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Table 3.6-2
Potential Waters of the U.S. and State Occurring within the BSA

Type of Jurisdictional Waters of the U.S. and State	Type of Habitat (Holland et al. 1986, 1996, 2006, 2008)[1]	Type of Habitat (Cowardin et al. 1979)	Area of Aquatic Resource (acres)
Jurisdictional Waters of the U.S.			
Wetland	Southern Coastal Brackish Marsh (52200)	Estuarine; Intertidal; Emergent, Persistent, Regularly Flooded, Mesosaline	131.4
Wetland	Southern Coastal Salt Marsh (52120)	Estuarine; Intertidal; Emergent, Persistent, Regularly Flooded, Mixohaline	262.1[2]
Wetland	Disturbed Wetland (11200)	Palustrine; Scrub/Shrub Broad-leaved, Deciduous, Seasonally Flooded, Fresh	1.2
Wetland	Sandbar Willow Scrub (63000)	Palustrine; Scrub/Shrub Broad-leaved, Deciduous, Seasonally Flooded, Fresh	8.9
Wetland	Southern Willow Scrub (63320)	Palustrine; Scrub/Shrub Broad-leaved, Deciduous, Seasonally Flooded, Fresh	61.0
Other Waters	Drainage Features/ Nonvegetated Channel (64200)	Riverine; Unconsolidated Bottom, Sand, Intermittently Flooded, Fresh	0.6 (3,640 linear feet)
Tidal Waters	Open Water/Subtidal Estuary (64131)	Estuarine; Subtidal; Unconsolidated Bottom, Mud, Mixohaline	40.2
Other Waters	Open Water/Salt Panne (64300)	Palustrine; Unconsolidated Bottom; Mud, Temporarily Flooded Saturated, Hyperhaline	37.0
Tidal Waters	Open Water/Tidal Mudflat (64200)	Estuarine; Subtidal; Unconsolidated Bottom, Mud, Regularly Flooded, Mixohaline	75.8
Subtotal Jurisdictional Waters of the U.S.			*618.2*
Jurisdictional Waters of the State			
Riprap Banks (Tidal Inlet Banks)	Disturbed Wetland (11200)	Riverine; Tidal; Artificial Substrate Irregularly Exposed, Mixohaline	1.9
Subtotal Jurisdictional Waters of the State			*1.9*
Grand Total Jurisdictional Waters			**620.1**

[1] The *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) does not provide classifications for abiotic features. These habitat codes are in accordance with the *Draft Vegetation Communities of San Diego County* (Oberbauer et al. 2008), based on the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Disturbed habitats are included as jurisdictional aquatic features.

[2] The 262.1 acres of southern coastal saltmarsh is composed of three components or saltmarsh zones: low coastal saltmarsh (4.7 acres), middle coastal saltmarsh (137.4 acres), and high coastal saltmarsh (120.0 acres).

Table 3.6-3
Summary of Jurisdictional Waters of the U.S. and State Occurring within the BSA

Type of Jurisdictional Waters of the U.S. and State	Regulatory Authority	Area (acres)
Jurisdictional Waters of the U.S.[1]		
Other Waters	CCC, CDFW, RWQCB, and Corps	37.6
Tidal Waters	CCC, CDFW, RWQCB, and Corps	116.0
Wetland	CCC. CDFW, RWQCB, and Corps	464.6
Subtotal Jurisdictional Waters of the U.S.		*618.2*
Jurisdictional Waters of the State		
Tidal Inlet Bank	CCC, CDFW, and RWQCB	1.9
Subtotal Jurisdictional Waters of the State Only		*1.9*
Grand Total Jurisdictional Waters		**620.1**

[1] Jurisdictional waters of the U.S. include jurisdictional waters of the state and are under the purview of the Corps, RWQCB, and CDFW. Of the 618.2 acres of waters of the U.S., approximately 71.7 acres are non-RHA Section 10 waters (e.g., nontidal waters) and are regulated, at the federal level, under Section 404 of the CWA. Therefore, the remaining 546.5 acres of waters of the U.S. are regulated under both Section 10 and Section 404. See the Appendix G, Attachment B (Preliminary JD Form) for the location and area of each non-RHA Section 10 water of the U.S.

Rare, Threatened, or Endangered Species

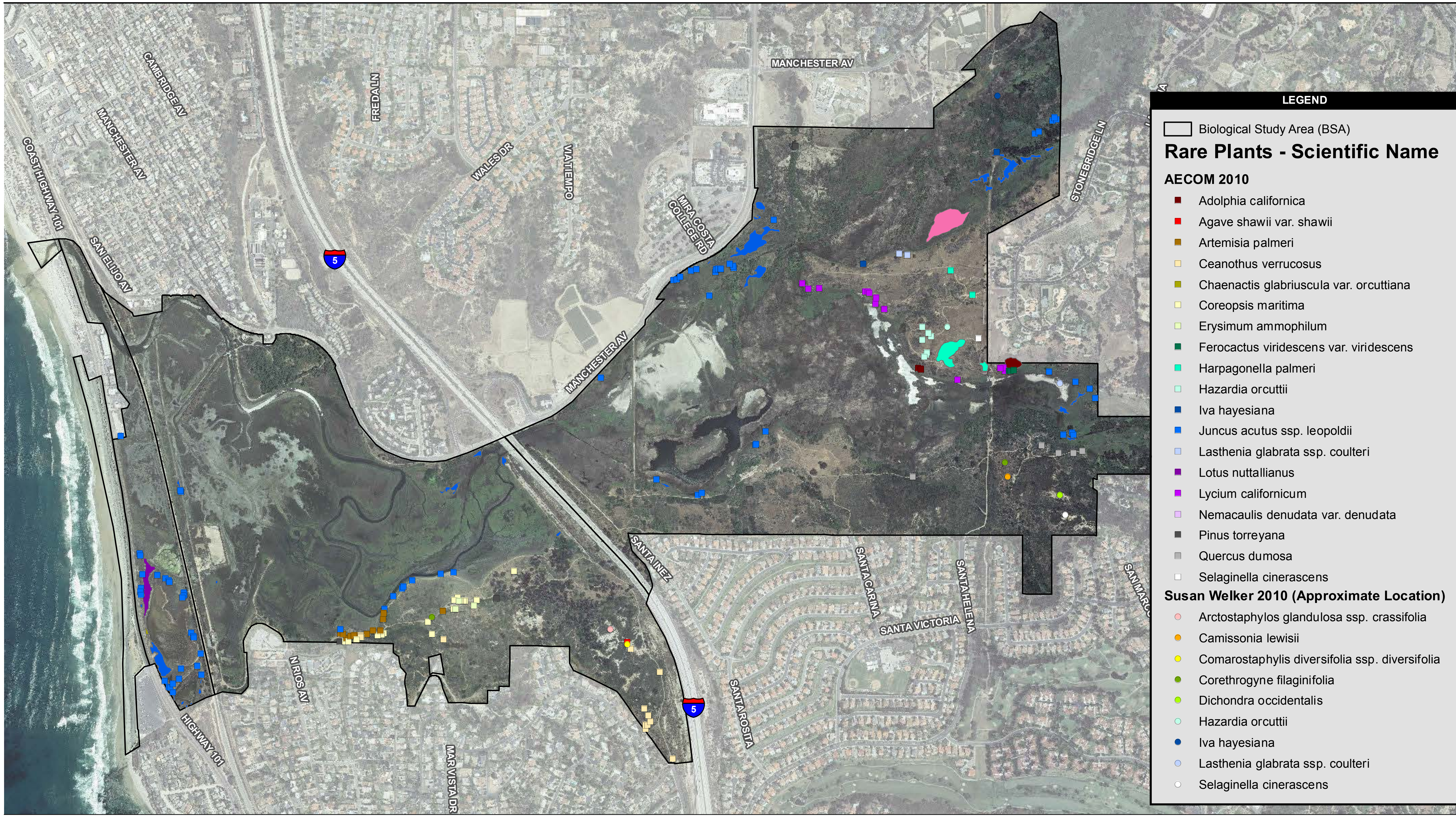
This section summarizes the sensitive flora (plants) and fauna (animals) known to occur, or with the potential to occur, within the BSA.

Flora

The BSA is biologically diverse with over 300 species of plants. As described in the BTR, 32 sensitive plant species (three federally listed) were determined to have some potential to occur in the BSA based on habitat conditions and regional location. Of these, 22 sensitive plant species were detected within the BSA during the 2010 botanical surveys. These 22 sensitive plant species and their locations are mapped in Figure 3.6-5 and identified below, organized by federally listed, state-listed, and nonlisted plant species. There is one federally listed plant species and one state-listed plant species; the remaining 20 are special-status, but not listed. Although discussed further in the BTR and impact section, it is important to note that no federally listed or state-listed rare, threatened, or endangered plant species occur within the areas proposed for restoration.

Federally Listed Plant Species

Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *Crassifolia*) was the only federally listed plant species found present within the BSA. Within San Diego County, this evergreen shrub is only found from Torrey Pines State Reserve north to Encinitas. Del Mar manzanita occurs in



Source: SANDAG 2012; AECOM 2014

1,100 550 0 1,100 Feet

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

Figure 3.6-5
Rare Plants within the BSA

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chaparral, often with chamise and wart-stemmed ceanothus (*Ceanothus verrucosus*) on eroding sandstone. Del Mar manzanita is found in the Diegan coastal sage scrub/chaparral community in the southern central portion of the BSA, just west of I-5.

State-listed Plant Species

Orcutt's goldenbush (*Hazardia orcuttii*) was the only state-listed plant species found present within the BSA. Orcutt's goldenbush is found from San Diego County south to Baja California, Mexico. Open chaparral with chamise and Diegan coastal sage scrub is the preferred habitat of this species (Reiser 2001). Approximately 25 Orcutt's goldenbush individuals are found in nonnative grassland Diegan coastal sage scrub in the eastern portion of the BSA.

Nonlisted Special-Status Plant Species

Under CEQA, special-status plant species are considered sensitive by the California Native Plant Society (CNPS) in Lists 1, 2, 3, or 4 (Appendix F). Of the 28 nonlisted sensitive plant species considered possible, 20 were found present within the BSA as shown in Figure 3.6-5. Nonlisted sensitive plant species detected on-site include spineshrub (*Adolphia californica*), San Diego sagewort (*Artemisia palmeri*), Lewis's evening-primrose (*Camissonia lewisii*), wart-stemmed ceanothus (*Ceanothus verrucosus*), Orcutt's pincushion (*Chaenactis glabriuscula* var. *orcuttiana*), summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*), sea dahlia (*Coreopsis maritima*), western dichondra (*Dichondra occidentalis*), coast wallflower (*Erysimum ammophilum*), coast barrel cactus (*Ferocactus viridescens* var. *viridescens*), Palmer's grapplinghook (*Harpagonella palmeri*), San Diego marsh-elder (*Iva hayesiana*), southwestern spiny rush (*Juncus acutus* ssp. *leopoldii*), Coulter's goldfields (*Lasthenia glabrata* ssp. *Coulteri*), Nuttall's lotus (*Lotus nuttallianus*), California desert thorn (*Lycium californicum*), coast woolly-heads (*Nemacaulis denudata* var. *denudate*), Torrey pine (*Pinus torreyana* var. *torreyana*), Nuttall's scrub oak (*Quercus dumosa*), and mesa spike-moss (*Selaginella cinerascens*).

For detailed population information for nonlisted plant species, refer to the BTR (Appendix F).

<u>Fauna</u>

The BSA is biologically rich with over 20 species of fish, over 20 species of reptiles and amphibians, 24 species of mammals, and over 295 bird species (including 65 nesting), in addition to a complex suite of terrestrial and marine invertebrates. As discussed in the BTR, 94 special-status wildlife species have potential to occur within the BSA (CDFG 2011; BioBlitz 2009; Patton 2010; SELC 2011; MEC 2002). Of these 94 special-status species, seven federally listed and/or state-listed species and 13 rare nonlisted species were detected during studies and are considered resident/breeding within the BSA. Location data that were available for special-status wildlife species detected in the BSA are shown in Figures 3.6-6 through 3.6-8. Detailed discussions of federally and state-listed special-status wildlife species detected during studies and considered resident/breeding within the BSA are provided below. Nonlisted special-status species with potential to occur, but considered migrants/nonbreeding season residents (no suitable breeding habitat is present on-site), are discussed only in Appendix F.

Federally Listed Species

The following six species listed as federally threatened or endangered were detected on-site during previous studies and are considered resident/breeding within the BSA:

- light-footed Ridgway's rail (*Rallus obsoletus levipes*)
- western snowy plover (*Charadrius alexandrinus nivosus*)
- California least tern (*Sternula antillarum browni*)
- southwestern willow flycatcher (*Empidonax traillii extimus*)
- least Bell's vireo (*Vireo bellii pusillus*)
- coastal California gnatcatcher (*Polioptila californica californica*)

Detailed information on the life history of these species is provided in Appendix F; a brief description of each species and their occurrence within the BSA is provided below.

LIGHT-FOOTED RIDGWAY'S RAIL

The light-footed Ridgway's rail is federally and state listed as endangered. The species is restricted to coastal salt marshes in Southern California where vegetation is dominated by cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia* sp.). It can also be found in brackish and freshwater marshes with cattails and bulrushes. Light-footed Ridgway's rail is a reclusive species and will nest and utilize relatively small patches of its preferred habitat when isolated from external anthropogenic disturbances (Zembal and Hoffman 2012).

Within the BSA, the light-footed Ridgway's rail is a year-round resident at San Elijo Lagoon and can be heard calling in the evening, although it is rarely seen. Total number of breeding pairs in the lagoon has ranged from six to 31 over the past 5 years, with 15 breeding pairs recorded both in 2010 and 2011 (Zembal et al. 2011), 31 pairs detected in 2012, and 20 pairs recorded in 2013 (Zembal et. al 2013). Breeding territories are usually focused in brackish marsh adjacent to saltmarsh, flats, and channels in the central basin north of the end of North Rios Avenue and adjacent to the Nature Center, and in the east basin between the CDFW dike and I-5, east of the

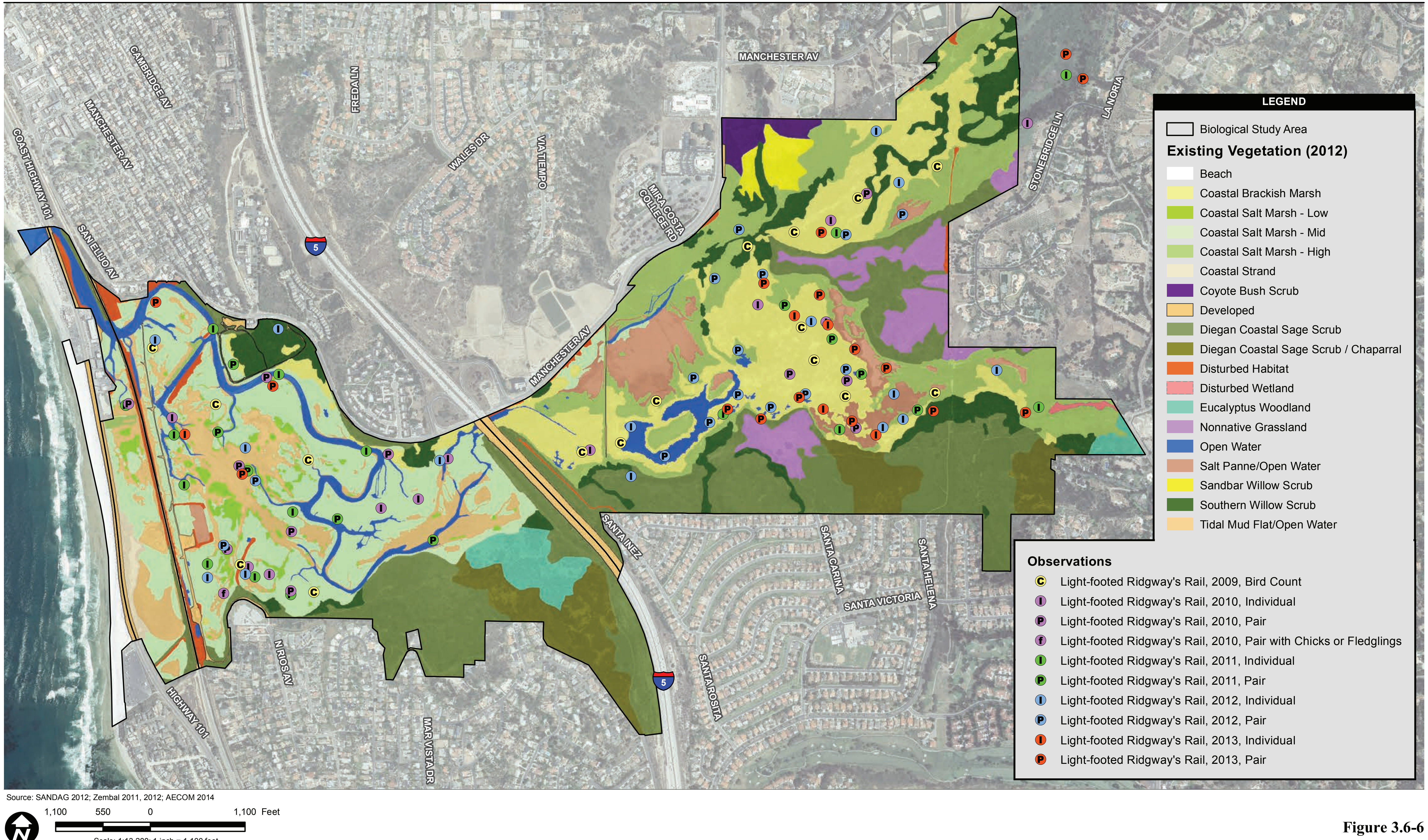

Figure 3.6-6
Light-footed Ridgway's Rail Observations

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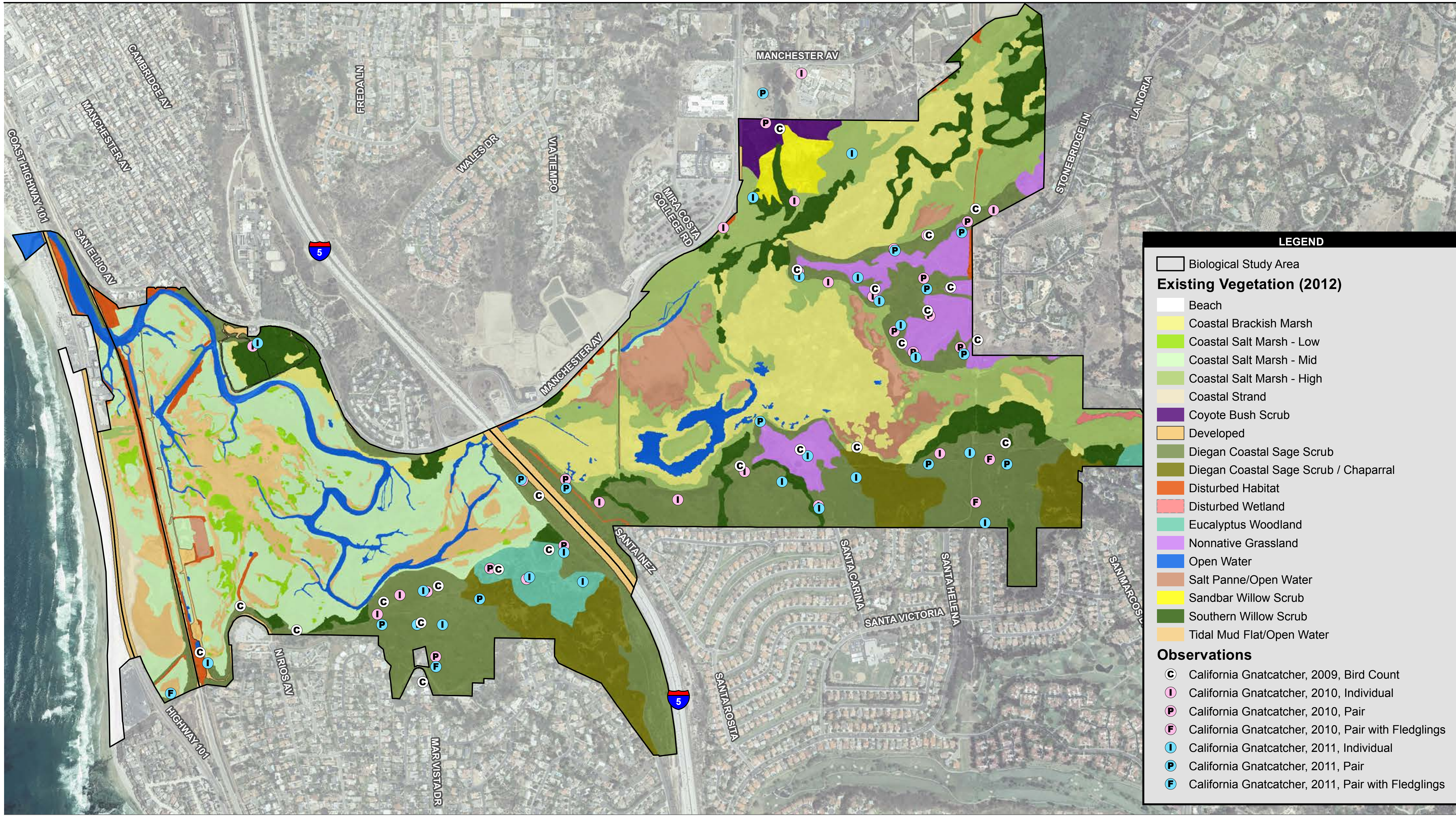

Source: SANDAG 2012; Patton 2010, 2012; AECOM 2014

1,100 550 0 1,100 Feet

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

Figure 3.6-7
California Gnatcatcher Observations

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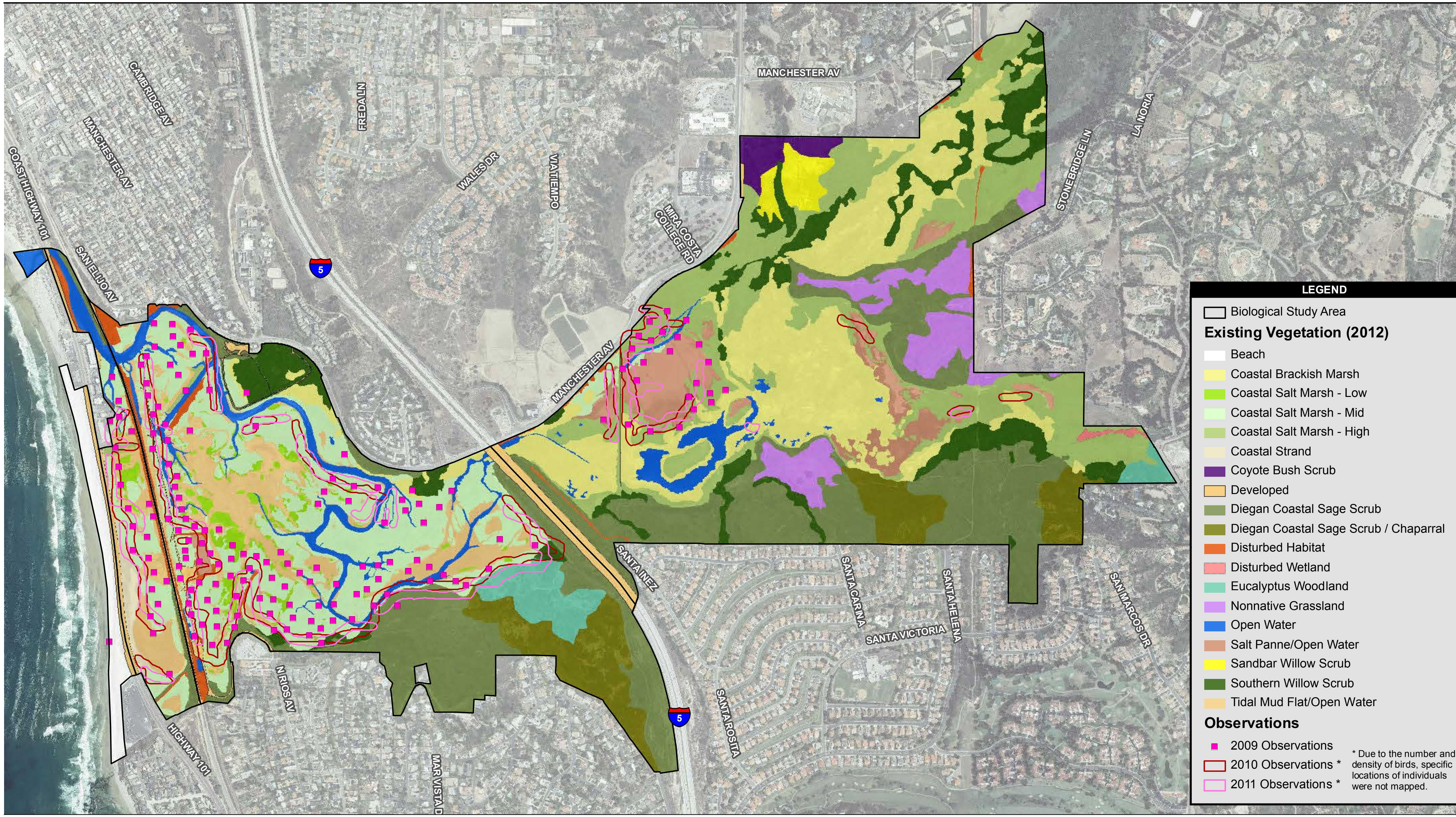

Source: SANDAG 2012; Patton 2010, 2011, 2012; AECOM 2014

1,100 550 0 1,100 Feet

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

Figure 3.6-8
Belding's Savannah Sparrow Observations

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south end of the dike, north of Santa Carina Street, and along Escondido Creek west of the power lines. In 2013, two pairs were detected in the west and central basins, and the remaining 18 pairs were detected in the eastern basin within the brackish marsh. Further counts detected light-footed Ridgway's rail in 16 locations throughout the BSA (Figure 3.6-6).

Western Snowy Plover

The western snowy plover is listed as federally threatened and a species of special concern by the state. Western snowy plover occurs along the Pacific coast from southern Washington to Baja California. It is a common winter migrant, winter visitor, and a declining and local resident in San Diego County. It nests on undisturbed, flat areas with loose substrate, such as sandy beaches and dried mudflats along the California coast. Western snowy plovers forage primarily on the wet sand at the beach-surf interface, where they feed on small crustaceans, marine worms, insects, and amphipods.

Within the BSA, western snowy plovers are regularly spotted foraging and roosting within mudflats and on the beach. Up to 76 western snowy plover individuals were recorded within the lagoon and adjacent beach area on September 29, 2011 (Patton 2012a). Historically, plovers were recorded nesting within the BSA on the east basin islands and east basin dike. Postbreeding and wintering roosting flocks have been documented at Cardiff State Beach, which is adjacent to the BSA. Roost sites have varied but have included both sides of the mouth of the lagoon. No breeding has been recorded within the lagoon since 2002 (Patton 2010).

California Least Tern

The California least tern is federally and state-listed as endangered. The species breeds from San Francisco Bay south to Baja California. In San Diego County, it is a fairly common summer resident from early April to the end of September (Unitt 2004). Wintering areas are thought to be along the Pacific coast of South America. The species historically nested colonially on beaches that are undisturbed, sparsely vegetated, flat areas with loose, sandy substrate. Few beach nesting areas remain and least terns are now found in varied habitats ranging from mudflats to airports. Adults roost primarily on the ground. They typically forage in areas with water less than 60 feet in depth and within 2 miles of roosting sites although they are considered opportunistic often shifting their behavior in response to local prey patterns (Atwood and Minsky 1983). The species nests in loose colonies in areas relatively free of human or predatory disturbance. Nests are on barren to sparsely vegetated sites near water, usually with a sandy or gravelly substrate.

Within the BSA, the least tern is a common migrant and has been observed foraging. Records indicate that this species historically had a breeding population within the BSA. They have nested in colonies on salt panne, patches of sand on alluvial fans and channel edges, and on the two islands in the east basin north of Santa Carina Street that were constructed by CDFW and County Department of Public Works in 1981. Changes in inundation patterns and habitat quality may have had a negative effect on breeding success within the BSA. No breeding has been documented since 2002 (Patton 2010).

Least terns were observed in very limited numbers and only relatively late in the season in 2011. Two to three were reported on June 12 and five to seven on July 11 foraging throughout the lagoon and nearshore waters and roosting on mudflats in the lagoon. One fledgling was observed along the beach on July 22 and two adults on August 8. No nests were documented in 2011 and no on-ground tern activity was observed on the salt panne east of the CDFW weir or in other potential nesting areas (Wolf 2011).

SOUTHWESTERN WILLOW FLYCATCHER

The southwestern willow flycatcher, a subspecies of willow flycatcher (*Empidonax traillii*), is a federally endangered species (USFWS 1995). The southwestern willow flycatcher was federally listed as endangered in 1995 and state listed as endangered in 1990.

The southwestern willow flycatcher is a summer breeding resident in riparian habitats in southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and northwestern Mexico (USFWS 1995). In San Diego County, only two breeding populations are known to remain along the Santa Margarita River and the upper San Luis Rey River. The southwestern willow flycatcher is restricted to dense riparian woodlands of willow, cottonwood, and other deciduous shrubs and trees. In general, the riparian habitat of this species tends to be rare, isolated, small, and/or in linear patches, separated by vast expanses of arid lands.

Within the BSA, this species was observed in the riparian habitat near the Nature Center in the northwestern central basin in May and June of 2002, two in the same area on May 30, 2004, and one individual on June 3, 2007. An individual was also observed along a trail west of El Camino Real on June 11, 2007 (Patton 2010) and one individual was reported along the La Orilla Trail west of El Camino Real on May 15, 2010 (Patton 2012b).

LEAST BELL'S VIREO

The least Bell's vireo was federally listed as endangered in 1986 and state listed as endangered in 1980. Least Bell's vireo breeding season extends from March through September. During the breeding season, the least Bell's vireo is restricted to riparian woodland and riparian scrub. In

San Diego County, it occurs mainly in the coastal lowlands, rarely up to 3,000 feet elevation. Territory size ranges from 0.5 to 7.5 acres and there is evidence of high site fidelity among adults (Kus 2002). Early to midsuccessional riparian habitat is typically used for nesting by this species because it supports the dense shrub cover required for nest concealment as well as a structurally diverse canopy for foraging (Kus 2002).

Within the BSA, this species has been recorded within southern willow scrub habitat. Observations of this species within willow scrub near the Nature Center were documented in 2007 (Patton 2010). In addition, breeding pairs were detected upstream of the La Bajada bridge in 2009 (Bache 2009). In 2011, breeding pairs were recorded adjacent to Escondido Creek and Lux Canyon Drainage (Patton 2012b).

COASTAL CALIFORNIA GNATCATCHER

The coastal California gnatcatcher was listed as federally threatened in 1993 and is a state species of special concern. Habitat preferences in San Diego County consist of Diegan coastal sage scrub dominated by California sagebrush and flat-topped buckwheat, which are the primary plants used by coastal California gnatcatchers when foraging for insects (RECON 1987; ERCE 1990). The species inhabits coastal sage scrub vegetation below 2,500 feet elevation in Riverside County and generally below 1,000 feet elevation along the coastal slope in San Diego County; it generally avoids steep slopes above 25 percent and dense, tall vegetation for nesting.

Within the BSA, the coastal California gnatcatcher is known to occur within the coastal sage scrub located on the slopes of the BSA. In 2009, gnatcatchers were recorded from 23 locations from within the BSA (Patton 2010). In 2010, gnatcatchers were recorded from 35 locations in the central and east basins (Patton 2012b). In 2011, gnatcatchers were recorded from 35 locations within the BSA (Patton 2012b) (Figure 3.6-7).

State-Listed Species

Of the 94 special-status species with potential to occur within the BSA, five species were listed as state threatened or endangered, were detected during previous studies, and are considered resident/breeding within the BSA: California least tern, least Bell's vireo, light-footed Ridgway's rail, southwestern willow flycatcher, and Belding's savannah sparrow (*Passerculus sandwichensis beldingi*). The California least tern, least Bell's vireo, light-footed Ridgway's rail, and southwestern willow flycatcher are also federally listed and were discussed above. The Belding's savannah sparrow is discussed in detail below.

Belding's Savannah Sparrow

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

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

Nonlisted Special-Status Wildlife Species

In addition to the federally and state-listed species discussed above, 13 nonlisted special-status wildlife species were detected during previous studies and are considered resident/breeding within the BSA. These are wandering (salt marsh) skipper (*Panoquina errans*), orange-throated whiptail (*Aspidoscelis hyperythra beldingi*), silvery legless lizard (*Anniella pulchra pulchra*), Cooper's hawk (*Accipiter cooperi*), northern harrier (*Circus cyaneus*), osprey (*Pandion haliaetus*), western bluebird (*Sialia Mexicana*), white-tailed kite (*Elanus leucurus majuscules*), yellow warbler (*Dendroica petechia brewsteri*), yellow-breasted chat (*Icteria virens*), California (western) mastiff bat (*Eumops perotis californicus*), western red bat (*Lasiurus blossevillii*), and southern mule deer (*Odocoileus hemionus fulginata*).

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

Nonlisted Migratory/Wintering Shorebirds

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

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

Wildlife Corridors/Connectivity

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

Local corridors allow resident animals to access critical resources (food, water, and cover) in other areas that might otherwise be isolated. A wildlife movement study was not conducted within the project area; however, the area is important to local wildlife movement. In general, wildlife species are likely to use habitat within the project area for movements related to home range activities (foraging for food or water; defending territories; searching for mates, breeding areas, or cover).

Regional corridors link two or more large areas of natural open space. San Elijo Lagoon is not functioning as a regional corridor. Instead, it is a large area of natural open space connected to Escondido Creek. Escondido Creek links San Elijo Lagoon with other open space habitat in Harmony Grove and the Elfin Forest to the northeast. San Elijo Lagoon is important in that it provides a large area of habitat for core populations of sensitive wildlife and plant species.

Materials Disposal/Reuse Study Area

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

The majority of the placement sites, with the exception of LA-5, were analyzed as receiver sites under the EIR/EA for the 2012 RBSP (SANDAG 2011); therefore, the biological conditions described for the 2012 RBSP have been considered (and updated as appropriate) in the Marine Biological Technical Report (Appendix H) for these sites and are summarized below. LA-5 was analyzed in the EIS for LA-5 (EPA 1987); therefore, the biological conditions described in the EIS for LA-5 are summarized below. Each of the seven proposed placement sites is described in terms of habitat and species identified within its boundaries (i.e., footprint) as well as nearby sensitive resources. Sensitive resources are defined at the habitat level to include vegetated nearshore reefs and kelp beds, and at the species level to include threatened or endangered species. Potential suitability of placement sites as spawning habitat for California grunion is noted in the text. Generally, sandy beaches with gentle slopes and sufficient beach width above the mean high tide line to support egg incubation would be suitable, while beaches with substantial cobble, steep slopes, or with complete wave run-up over average high tides would not be suitable. The site assessment considers the potential for suitability to change during the course of the grunion spawning season, which primarily ranges from March through August, due to natural seasonal sand level changes on beaches.

On Shore Placement Sites

Habitat within Placement Site Boundaries

Beach

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

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

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

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

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

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

Reefs

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

Nearby Sensitive Resources

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

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

Encinitas-Moonlight: Habitat directly offshore is primarily sand with sparse cobble and rocks mainly vegetated with turf algae. Sparse surfgrass has historically been mapped offshore and may occur (MEC 2000); however, the 2002 Nearshore Program did not identify any. Substantial reef with understory algae and subtidal surfgrass occurs approximately 400 to 500 feet, respectively, offshore and upcoast of the northern boundary of the site. Sensitive hard-bottom habitat is located 330 feet from the site, while intertidal surfgrass is approximately 3,000 feet. Kelp beds were mapped approximately 850 feet offshore.

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

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

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

Critical Habitat

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

No critical habitat exists within or in proximity to the Encinitas-Moonlight, Solana Beach, and Leucadia placement sites.

Essential Fish Habitat

As described previously, EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Pacific Ocean (adjacent to placement sites) is designated as EFH for Pacific Groundfish and Coastal Pelagic species.

Rare, Threatened, or Endangered Species

Federally Listed Species

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

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

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

*Active nesting within last 5 years except at historical and new sites.
mi = mile(s)

Grunion

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

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

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

Overview of Site and Adjacent Locations

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

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

Overview of Marine Resources

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

Sea turtles

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

Marine Mammals

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

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

3.6.2 CEQA Thresholds of Significance

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

<u>Sensitive Riparian and Natural Vegetation Communities</u>

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

All habitats within the San Elijo Lagoon BSA, as well as aquatic habitats (high-relief reefs and vegetated low-relief reefs), that may be located offshore of the sand placement locations, are considered sensitive based on local, regional, and state guidance, with the exception of eucalyptus woodland, disturbed habitat, and other land cover types such as “developed.” For the purposes of this project, the term “substantial” is defined as a temporary or permanent change that would cause a loss of more than 50 percent of a sensitive habitat for more than 12 months, because greater than 50 percent loss of any sensitive habitat is considered to have the potential to threaten the continued existence of a sensitive species known to occur within San Elijo Lagoon, as described in more detail in the Sensitive Species section below (Chambers Group 2001).

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

Impacts to EFH are typically determined based on whether a project reduces quality and/or quantity of EFH, regardless of the degree to which that impact occurs. Based on the Magnuson-Stevens Act, adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species, and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. By definition, the NOAA threshold to have an adverse impact to EFH is low; however, the nature of the impact can be further qualified based on the type of impact (e.g., temporary or permanent) and whether that impact is substantial based on best professional judgment. Therefore, this section refers to impacts to EFH in terms of compliance with the Magnuson-Stevens Act, as well as whether a significant or substantially adverse impact to EFH would occur, per CEQA/NEPA (Appendix H).

Wetlands

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

The majority of San Elijo Lagoon is considered a jurisdictional water/wetland by the Corps, CDFW, RWQCB, and County of San Diego. For the purpose of this project, a substantial adverse effect on a federally protected wetland would include a permanent loss of wetlands in terms of aquatic function and value. Potential water quality impacts (including turbidity, salinity, etc.) associated with wetland function and value are addressed in Section 3.4 Water and Aquatic Sediment Quality and are not addressed herein.

Sensitive Species

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

For the purposes of this project, the term “substantial” is defined as a temporary or permanent change that would cause a decline in the local population of a species to below self-sustaining levels within San Elijo Lagoon. Data are lacking for most species regarding the size of a self-sustaining population for a given area of habitat; however, for the purposes of this analysis, a 50 percent decline in the lagoon breeding population (i.e., movement out of lagoon and not direct mortality) or a temporary loss of more than 50 percent of the suitable nesting habitat for that population at the lagoon, was considered a threat to the continued existence of the San Elijo Lagoon population (Chambers Group 2001). The 50 percent threshold has been chosen based on previous environmental impact evaluation for another large lagoon restoration project, Bolsa Chica Restoration Project, and best professional judgment (Chambers Group 2001). In addition, the direct loss of adults, eggs, or young of species listed as endangered or threatened would be a significant impact. For example, an impact would be considered less than significant if the selected SELRP alternative would ultimately contribute to the long-term increase of the population even though construction would result in a temporary loss of 35 percent of the nesting areas or breeding habitat for species listed as endangered or threatened.

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

D. Have a substantial adverse effect on the movement of a native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

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

<u>Local Ordinances, Policies, Adopted Plans</u>

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

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

3.6.3 Environmental Consequences

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

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

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

Lagoon Restoration

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

Alternative 2A

<u>Sensitive Riparian and Natural Vegetation Communities</u>

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

Short-term/Temporary

Construction of Alternative 2A would result in temporary impacts to sensitive habitats associated with grading and dredging operations (Figure 3.6-9), as well as from extended inundation. The project is anticipated to take approximately 3 years to construct and would be phased to minimize impacts to lagoon habitats, allowing for refuge for species and retaining some habitat areas at any given time during construction. Phasing includes limitations on the overall duration of time a lagoon basin would be impacted, as well as limitations on the overall inundation and construction area within a given basin. Inundation would allow for dredging of channels within each basin. As described in Chapter 2, inundation durations were minimized to the extent practicable and vary by lagoon basin (west, central, or east) (see Section 2.10.15 Project Design Features). Wet construction methods have been identified to the extent possible to minimize additional impacts associated with dry construction approaches in wetlands. Limits on inundation have been placed to minimize impacts due to flooding, including limiting the initiation of habitat flooding to outside the breeding season (PDF-17), utilizing flooding to flush birds where possible prior to clearing and grubbing (PDF-19), and clearing and grubbing within flooded areas or utilizing a biological monitor to flush wildlife (PDF-18). Impacts are summarized in Table 3.6-5 and are separated into two types of short-term impacts: areas that would be graded/dredged during construction, and areas that would be affected by inundation only. A complete breakdown of impacts by basin is provided in the BTR included in Appendix F.

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

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

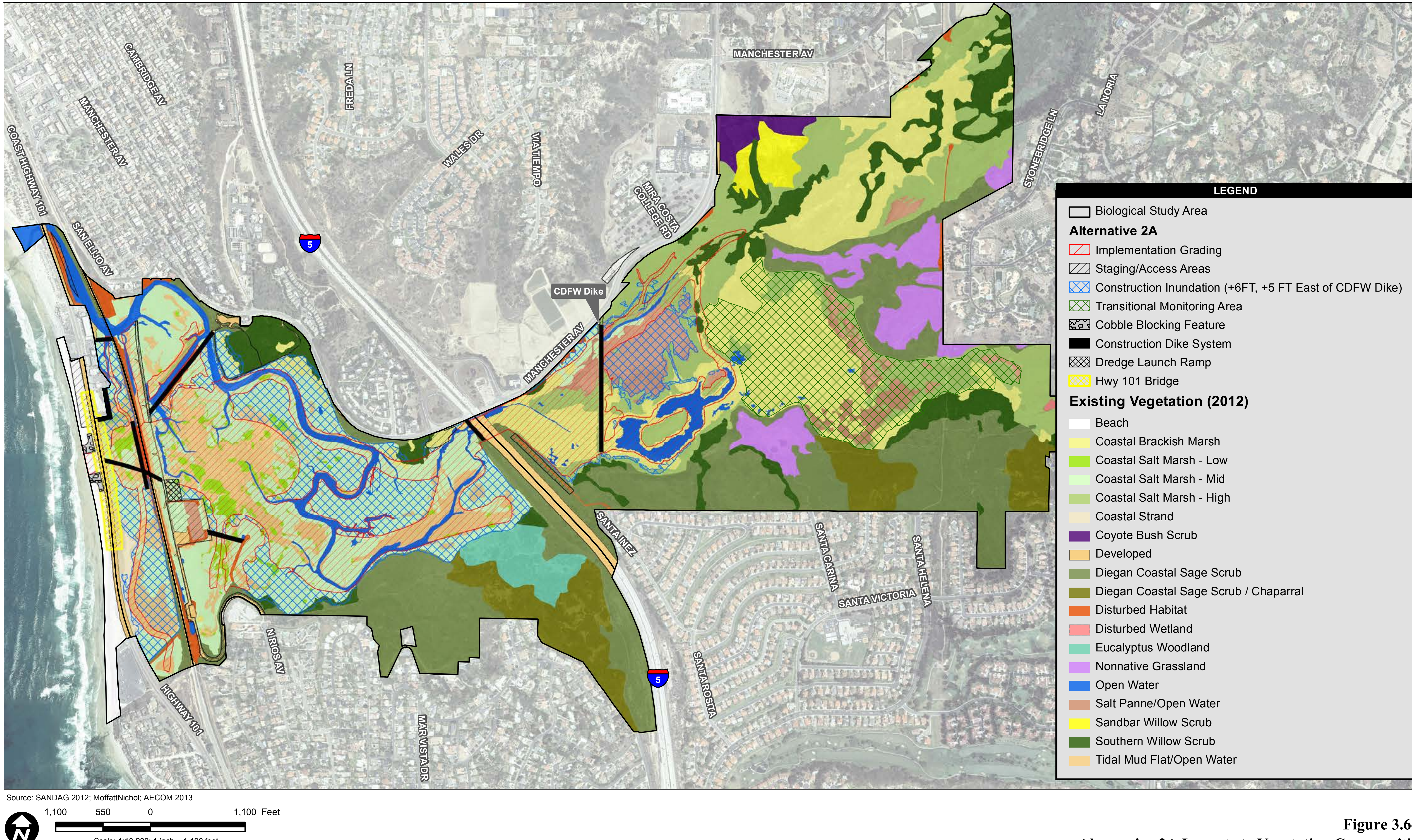

Figure 3.6-9
Alternative 2A Impacts to Vegetation Communities

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

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

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

Temporary impacts to beach, coastal brackish marsh, high coastal salt marsh, coastal strand, Diegan coastal sage scrub, and southern willow scrub are not considered significant because greater than 50 percent of the local habitat would remain available to local resident and migratory species during construction. Prior to construction, sensitive “no construction” zones would be identified and fenced or flagged to avoid impacts outside of the identified limits of disturbance (PDF-16). These areas would be monitored throughout construction by a qualified biologist (PDF-13). **Short-term direct impacts to beach, coastal brackish marsh, high coastal salt marsh, coastal strand, Diegan coastal sage scrub, and southern willow scrub are therefore considered less than significant and not substantially adverse (Criterion A).**

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

<u>USFWS Critical Habitat</u>

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

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

Essential Fish Habitat

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

Indirect Impacts

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

Long-Term/Permanent

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

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

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

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

[1] Totals may not sum due to rounding.

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

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

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

<u>*USFWS Critical Habitat*</u>

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

Essential Fish Habitat

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

<u>Jurisdictional Waters and Wetlands</u>

Short-term/Temporary

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

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

Indirect Impacts

Short-term indirect impacts to jurisdictional waters would include changes in habitat or water quality that may result from project implementation. Indirect impacts to vegetation are described under sensitive vegetation communities, and impacts to water quality are described in Section 3.4. **No significant or adverse indirect impacts to wetlands are anticipated with restoration implementation (Criterion B).**

Long-Term/Permanent

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

Indirect Impacts

Long-term indirect impacts to jurisdictional waters would include changes in habitat or water quality that may result from project implementation. Indirect impacts to vegetation are described under sensitive vegetation communities, and impacts to water quality are described in Section

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

Sensitive Species

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

Flora

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

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

Fauna

Of the 94 special-status wildlife species that have potential to occur within the BSA, seven federally and/or state-listed species were detected during previous studies and are considered resident/breeding within the BSA. These include the federally listed coastal California gnatcatcher and western snowy plover; the federally and state-listed light-footed Ridgway's rail, California least tern, southwestern willow flycatcher, and least Bell's vireo; and the state-listed Belding's savannah sparrow. These seven bird species utilize different habitats within the lagoon and as such are expected to be influenced differently by the restoration project. Potential impacts to nonlisted special-status species known to occur and possibly breed on-site are described in detail in the BTR (Appendix F). Within the EIR/EIS, the impacts to nonlisted special-status species are captured within the listed species discussion and impact analysis as the listed species cover broad geographic areas and habitats within the BSA (Appendix F). There is the potential for short-term/temporary effects as well as long-term/permanent effects associated with the implementation of Alternative 2A. These effects may be considered negative (impact) or positive (benefit); both are discussed below.

SHORT-TERM/TEMPORARY

DIRECT

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

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

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

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

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

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

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as "foraging" is not expected to support breeding activities.
**Under existing conditions a portion of the nesting area is classified as salt panne.

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

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

Both California least tern and western snowy plover are documented annually foraging and roosting at San Elijo Lagoon, but neither is known to breed in the lagoon. Foraging nonlisted special-status species are discussed in the BTR (Appendix F). The western snowy plover forages on mudflats and beach habitats while the least tern utilizes subtidal channels and open water within the lagoon. Impacts to foraging habitat for both species would occur during construction with 4.9 (33 percent) acres of beach, 27.4 (68 percent) acres of open water/tidal channels, and 57.7 acres (91 percent) of mudflat disturbed as a result of grading and controlled inundation for Alternative 2A. A total of 27.4 acres (50 percent) of California least tern and 57.7 acres (74 percent) of western snowy plover suitable foraging habitat would be impacted as a result of construction for Alternative 2A. All impacts to foraging habitat would be phased across the three lagoon basins, and within each basin (i.e., daily dredging focused in a small area), so that large contiguous areas of foraging habitat would remain at any given time. Foraging species are highly mobile and move throughout the lagoon as well as up and down the coast; as such the temporary loss of their potential foraging habitat is not expected to have a substantial adverse effect on these species. In addition, many of these areas post-restoration are expected to return to the same habitat type but with improved conditions as a result of improved hydrology. Although short-term impacts to foraging habitat would occur, short-term benefits are also expected. Sediment-dwelling organisms would be released into the water column during dredging, which may improve foraging efficiency for diving birds such as the least tern. The benthic community that resides in the mudflats would be temporarily impacted; recovery time for these communities is highly variable with location and environmental conditions but is anticipated to be relatively rapid. Soils within proposed mudflat areas would be native soils lowered slightly in elevation, or soils slurried from shallow excavation of the lagoon basins, and placed on the sand cap on the overdredge pit in the central basin. In both cases, the exposed mudflat soils would consist of native marsh soils that contain native infauna that would facilitate recovery. The recovery of the benthic community would be monitored as part of the monitoring and maintenance program. The relatively quick recovery time coupled with improved tidal hydrology and water quality is expected to enhance the benthic community within the lagoon and in particular the mudflats. The improved conditions would result in higher productivity in the restored mudflats and direct benefits to birds that forage on them, such as the western snowy plover. Similarly, the improved hydrologic and water quality conditions are expected to have a positive effect on the fish community, which is the primary food of California least tern. **Therefore, short-term direct impacts to western snowy plover and California least tern are considered less than significant and not substantially adverse (Criterion C).**

Belding's savannah sparrow occupy mid- and high-marsh habitat throughout San Elijo Lagoon but are particularly dense in the central basin and western portion of the east basin where pickleweed-dominated mid-marsh habitat is prevalent. As a result of dredging and controlled inundation, Alternative 2A would temporarily impact 119.6 acres (85 percent) of mid-marsh and 15.8 acres (13 percent) of high-marsh habitat across the three basins (BTR; Table 3.6-7, and Figure 3.6-10). As a result of construction for Alternative 2A, 135.4 acres out of 261.4 acres (52 percent) of suitable nesting habitat for Belding's savannah sparrow would be impacted. Although Belding's savannah sparrows maintain territories, they do not often nest in the exact same location. In addition, the size of the territories and their boundaries are variable and change year to year based on environmental conditions, with expansion in dry years and contraction in wet years. It is anticipated that the resident birds would respond to the restoration as they do to seasonal variability by shifting and contracting their territory size to accommodate the new acreage available. The project would minimize impacts by removing vegetation outside of the breeding season to avoid direct impacts to Belding's savannah sparrow and to allow the birds time to establish new breeding territories in unimpacted habitat. In addition, the project has included the creation of dry and noninundated refugia during Phase 1 and Phase 2 to maximize the potential breeding habitat available during construction. Finally, the project includes a habitat enhancement plan as a design feature that would be developed and implemented prior to and during construction to enhance target locations of unimpacted suitable habitat for Belding's savannah sparrow (PDF-21). The habitat enhancement plan would allow for refugia during construction, when suitable breeding and foraging habitat areas would be reduced. The plan would include measures such as removal of perches that competitor birds (song sparrow) use, removal of non-pickleweed vegetation, and predator control. Belding's savannah sparrow is a year-round resident and project construction would result in the temporary loss of greater than 50 percent of their nesting habitat (mid- and high-salt marsh). This temporary construction impact is considered a significant impact to the local population. **As such, Alternative 2A would have a significant and adverse short-term direct impact on Belding's savannah sparrow (Criterion C).**

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

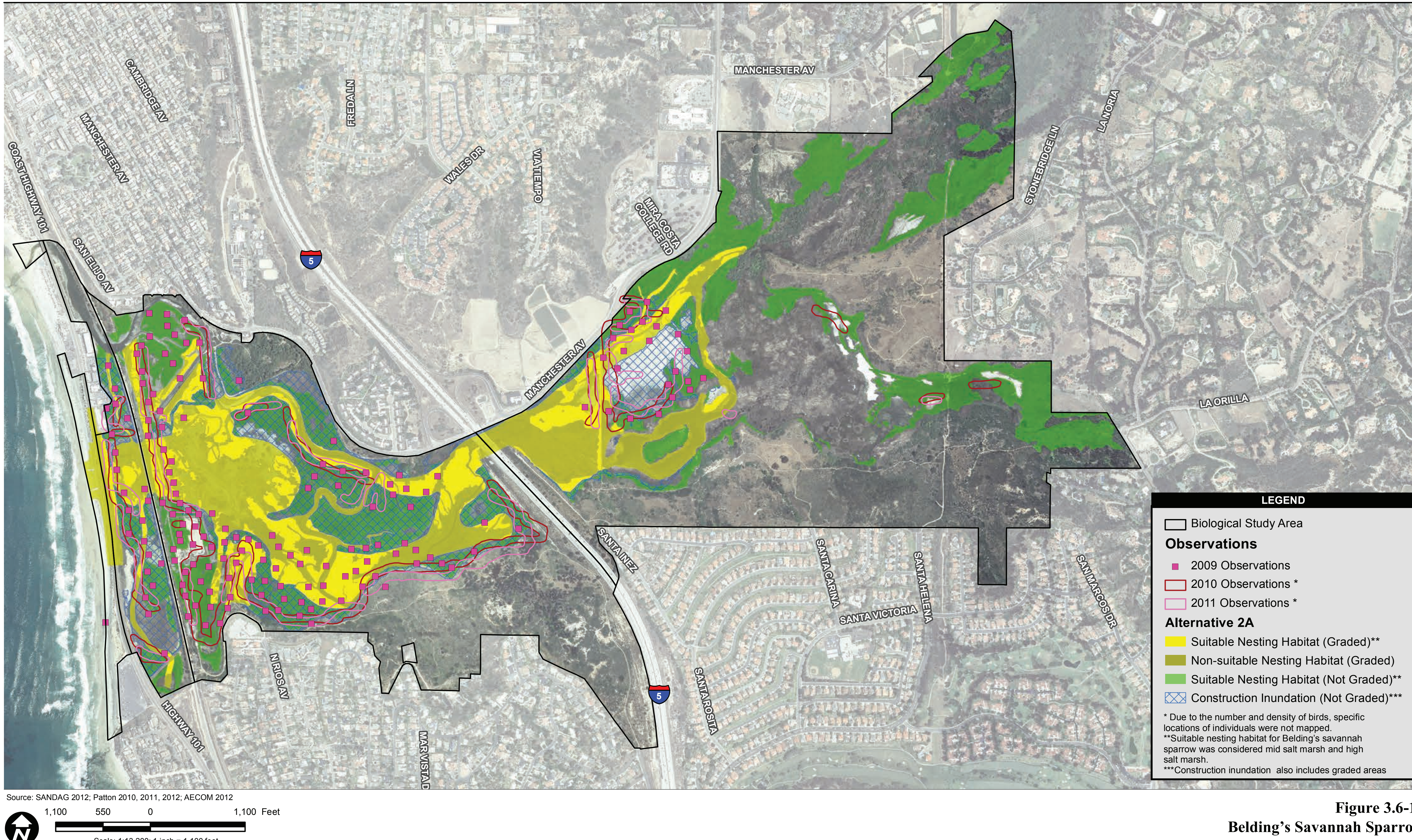

Figure 3.6-10
Belding's Savannah Sparrow
Suitable Nesting Habitat Impact Analysis, Alternative 2A

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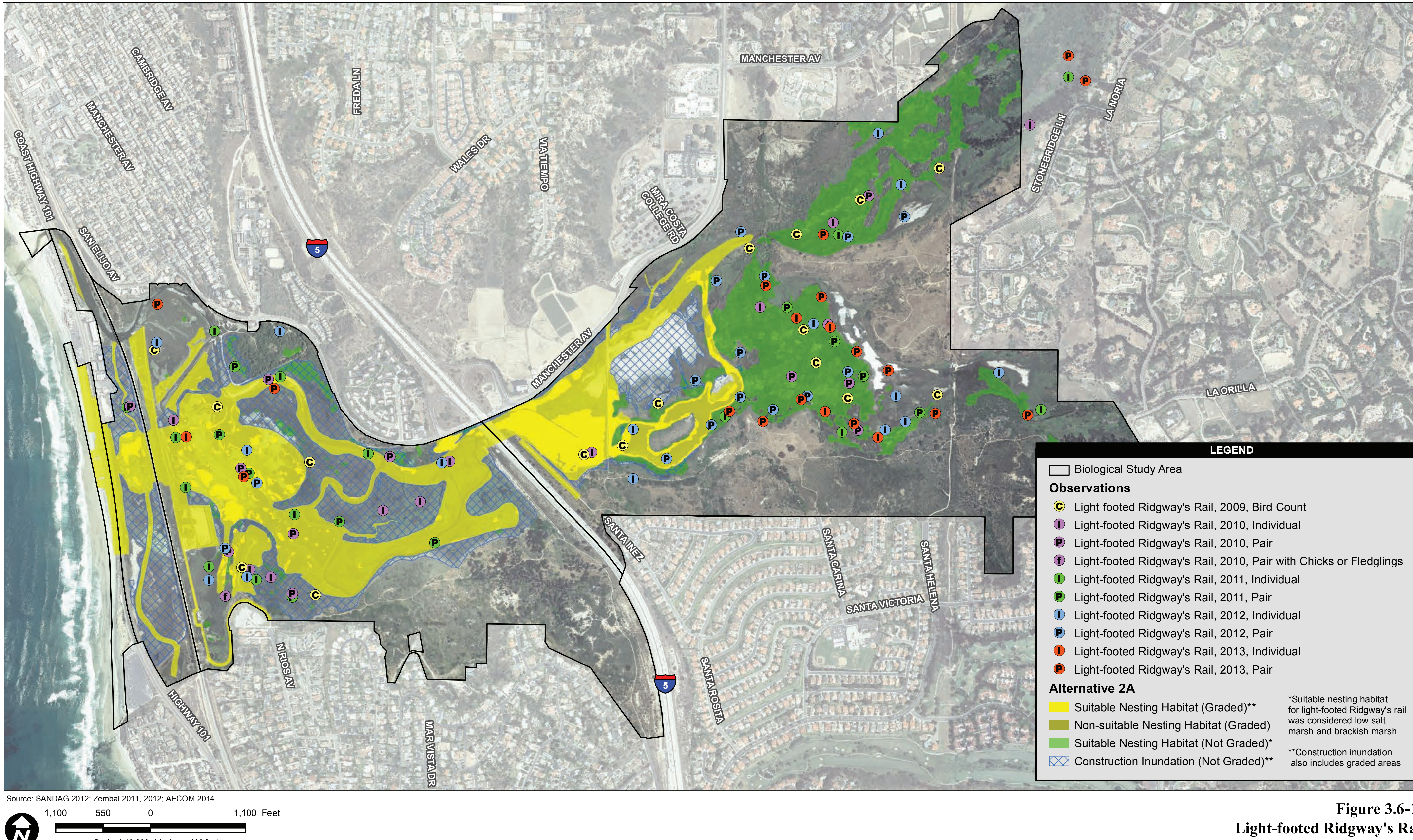

Figure 3.6-11
Light-footed Ridgway's Rail
Suitable Nesting Habitat Impact Analysis, Alternative 2A

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

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

INDIRECT

Indirect short-term/temporary effects to sensitive species may include increases in exposure to predators, degraded water quality, disturbed unconsolidated sediment, night lighting, and noise.

During construction, and as habitat becomes reestablished on-site, Belding's savannah sparrow and light-footed Ridgway's rail may be exposed to higher predation as they would be more concentrated in the remaining undisturbed habitat, much of which is located along the perimeter of the lagoon. In addition, many of the undisturbed areas considered suitable nesting habitat for these species are not currently used for nesting, indicating it may not be preferred nesting habitat. To reduce temporary impacts to marsh birds resulting from the indirect effects of the short-term loss of nesting and foraging habitat, the project has included a variety of design features such as preparation and implementation of a habitat enhancement plan and a predator control program (PDF-21), as described above under direct short-term/temporary impacts.

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

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

In addition to indirect impacts described above, there is also the potential for short-term indirect noise impacts to sensitive species as a result of construction activities. As described in Section 3.12 Noise, existing ambient noise levels at San Elijo Lagoon are considered moderate for a natural setting and are directly related to the numerous transportation corridors that traverse the lagoon. The largest contributors to ambient noise levels are I-5, separating the lagoon's largest two basins, and Coast Highway 101 near the western edge of the lagoon. In addition, Manchester Road borders the northern edge of the lagoon and the railroad separates the west and central basins. Short-term noise measurements ranged from 47.0 to 65.4 A-weighted decibels (dBA) L_{eq} with corresponding maximum noise levels (loudest single moment) ranging from 58.2 to 86.7 dBA L_{max}. The Draft Encinitas General Plan Update (City of Encinitas 2012) included a model of existing traffic noise contours near the lagoon (excluding the railroad), which is reproduced in Section 3.12. As shown, the highest noise levels are found closest to I-5 and reach 80 dBA community noise equivalent level (CNEL). Noise dissipates exponentially and, as such, the greatest reduction occurs in short distances from the source. The contours illustrate that the quietest areas in the lagoon are located in the middle and eastern portions of the east basin and the southwest corner of the central basin (although the railroad was not included in the contours). Ambient CNEL noise levels do not drop below 60 dBA until the eastern edge of the BSA.

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

Species that occupy habitat at the lagoon edge, or outside the impact footprint, would be less affected by noise than those species occurring within the impact footprint. These edge species include least Bell's vireo, southwestern willow flycatcher, and coastal California gnatcatcher. Sensitive birds, including Belding's savannah sparrow and light-footed Ridgway's rail, currently forage and breed throughout the lagoon and can be found distributed throughout the noise contours where appropriate foraging and nesting habitat occurs. Although the ambient noise levels are high for a natural system and the species have adapted to them, the addition of a dredge and other construction equipment would increase ambient levels. Currently, noise levels for the dredge are estimated at 73 dBA CNEL at 50 feet and 67 dBA CNEL at 100 feet. Other individual pieces of construction equipment may reach maximum noise levels of 80 dBA at 50 feet for most equipment (Section 3.12), but use of these types of large equipment is anticipated to be localized to areas that are likely to support dry construction (i.e., along the access road, CDFW dike, utility corridor, and nesting area). When in proximity to wildlife, the effects of dredge and other construction noise would likely be pronounced and may result in modified foraging or breeding behavior. The greatest impact from noise would occur within the first 200 feet of equipment and would dissipate exponentially with distance. For example, one piece of equipment that generates a maximum noise level of 80 dBA at 50 feet (typically with a usage factor of 40 percent; i.e., fraction of time that the equipment is operated at full power) would attenuate to 60 dBA L_{eq} 240 feet from the source. The noise impact would be more pronounced within the quieter areas of the lagoon as opposed to the louder areas near the roads. The dredge is slow moving and construction would occur in one basin at a time; therefore, quieter habitat would always be available for birds to relocate to. However, relocation during the breeding season is not feasible for nesting birds. Avoiding construction during the breeding season was evaluated as part of the development process for this project, which included participation by resource agencies. Avoiding the breeding season would almost double the length of construction and might in fact pose a larger impact to resident marsh birds, including the listed light-footed Ridgway’s rail and Belding’s savannah sparrow, that breed in the lagoon. As such, the contiguous construction phased across basins is the project’s best attempt to minimize overall noise impacts to sensitive species.

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

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

LONG-TERM/PERMANENT

DIRECT

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

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

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

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

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

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

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as "foraging" is not expected to support breeding activities.
**Under existing conditions, a portion of the nesting area is classified as salt panne.

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

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

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

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

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

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

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

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

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

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

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

INDIRECT

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

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

It is possible that reduced periods of saturation and increased salinity may make transitional areas in the east basin more prone to invasion by nonnative species. In particular, areas going through a transition from one habitat type to another may have an increased percentage of bare ground as species die and new recruits arrive. Of particular concern is the salt-tolerant *Tamarix* spp. (tamarisk or salt cedar), which can be highly invasive in estuarine systems and preclude native plant community development. Nonnative invasive species have the potential to exclude native plant recruits and ultimately shape the vegetation community to something less than suitable for estuarine wildlife, including the Belding's savannah sparrow and light-footed Ridgway's rail. As part of the post-construction habitat monitoring and maintenance program for this project, the occurrence of these invasive species would be closely monitored as well as the potential die-off of emergent vegetation (i.e., cattails) in the east basin. Future maintenance would regularly treat invasive species to limit the possibility of invasion. Indirect impacts to sensitive species resulting from invasive species are not considered substantial.

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

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

<u>Wildlife Corridors/Connectivity</u>

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

No long-term impacts are anticipated. The project area would still function as a large area of natural open space that would allow for wildlife movement similar to existing conditions. **Therefore, no significant or substantially adverse short-term or long-term impacts to wildlife movement/connectivity are anticipated with implementation of Alternative 2A (Criterion D)**.

Local Ordinances/Policies/Adopted Plans

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

Alternative 1B

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

Sensitive Riparian and Natural Vegetation Communities

Short-term/Temporary

Construction of Alternative 1B would, similar to Alternative 2A, result in temporary or short-term impacts to sensitive habitats associated with grading and dredging operations. The project is anticipated to take approximately 3 years to construct and would be phased to minimize impacts to the lagoon habitats, allowing for refuge and retaining some available habitats at any given time during construction. Inundation durations would be similar to Alternative 2A, as areas proposed for inundation would be inundated for 3 months or longer. Therefore, it is assumed that this vegetation would be substantially impacted and, as a worst-case scenario, it is assumed that vegetation in inundated areas would not survive (i.e., habitat would be lost for more than 12 months). The adaptive management program and conceptual restoration plan (Appendix Q) for the project, as described in Chapter 2.11, includes measures for monitoring and maintenance activities to aid in the recovery of inundated vegetation communities.

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

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

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

Similar to Alternative 2A, restoration construction would result in greater than 50 percent temporal loss of sensitive habitats that would be significantly impacted by construction including coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats. The temporal loss of these habitats may threaten local populations of sensitive resident species, as described further in the Sensitive Species section below. **Short-term direct impacts to coastal salt marsh (low- and mid-), open water, salt panne/open water, and tidal mudflats are therefore considered significant and adverse (Criterion A).**

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

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

USFWS Critical Habitat

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

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

Essential Fish Habitat

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

Indirect Impacts

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

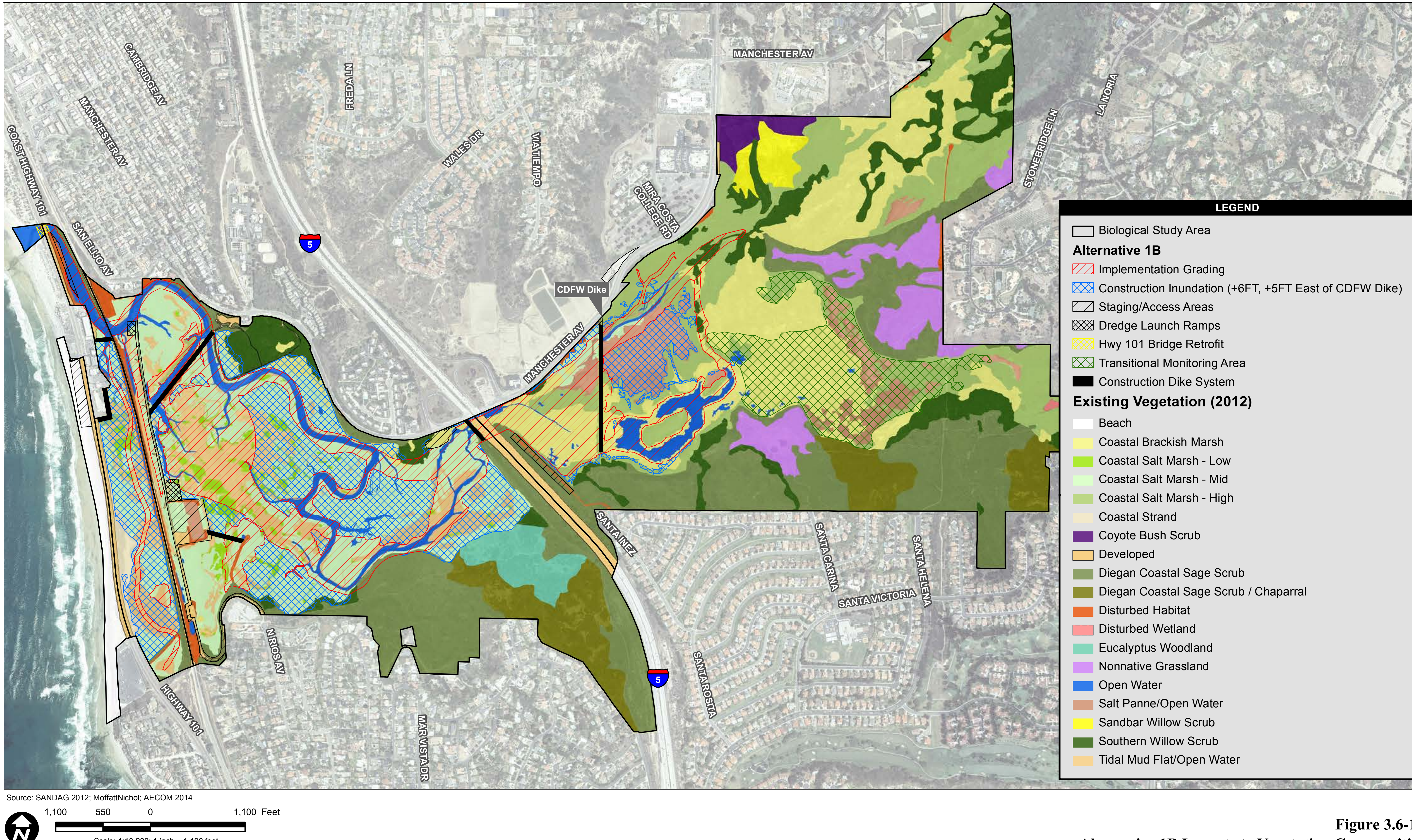

Figure 3.6-12
Alternative 1B Impacts to Vegetation Communities

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Long-Term/Permanent

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

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

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

Alternative 1B would facilitate the efficient conveyance of seasonal freshwater flows through the system to the existing inlet. Similar to Alternative 2A, an avian nesting area located in the central basin would be established. Removal of the CDFW dike under this alternative may restrict management options that would support avian nesting on salt panne habitat in the east basin. As described under Alternative 2A, the salt panne habitat existing within the lagoon is a relic habitat that the SELRP anticipates retaining, although the location of the salt panne is not typical of natural salt panne habitat in other regional lagoons and estuaries. CDFW does not currently actively manage water levels east of the dike, although, in the past, gates within the dike were opened and closed seasonally. While this alternative would remove the CDFW dike and increase hydraulic efficiency of the channel adjacent to the existing salt panne, a portion of the dike would be left in place west of the salt panne as transitional area and it is anticipated that the salt panne would continue to be inundated occasionally during high water flow conditions, although it may drain more quickly. Similar sequences of inundation, drainage, and evaporation would occur, enabling the continued existence of the habitat.

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

USFWS Critical Habitat

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

Essential Fish Habitat

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

Indirect Impacts

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

Jurisdictional Waters and Wetlands

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

Sensitive Species

Flora

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

Approximately 11 individuals of southwestern spiny rush (CNPS List 4.2) are within the grading limits of Alternative 1B and would be directly impacted. However, this direct impact is not considered significant, due to the several hundred individuals scattered throughout the mid- and high-salt marsh habitats within the lagoon. The large population of southwestern spiny rush is expected to persist within the lagoon, as the majority of the mid- and high-salt marsh habitats would remain intact. **Therefore, no significant or substantially adverse impacts to sensitive plant populations are anticipated with construction of Alternative 1B (Criterion C).**

Fauna

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

SHORT-TERM/TEMPORARY

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

DIRECT

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

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

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

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

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

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as "foraging" is not expected to support breeding activities.
**Under existing conditions, a portion of the nesting area is classified as salt panne.

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

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

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

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

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

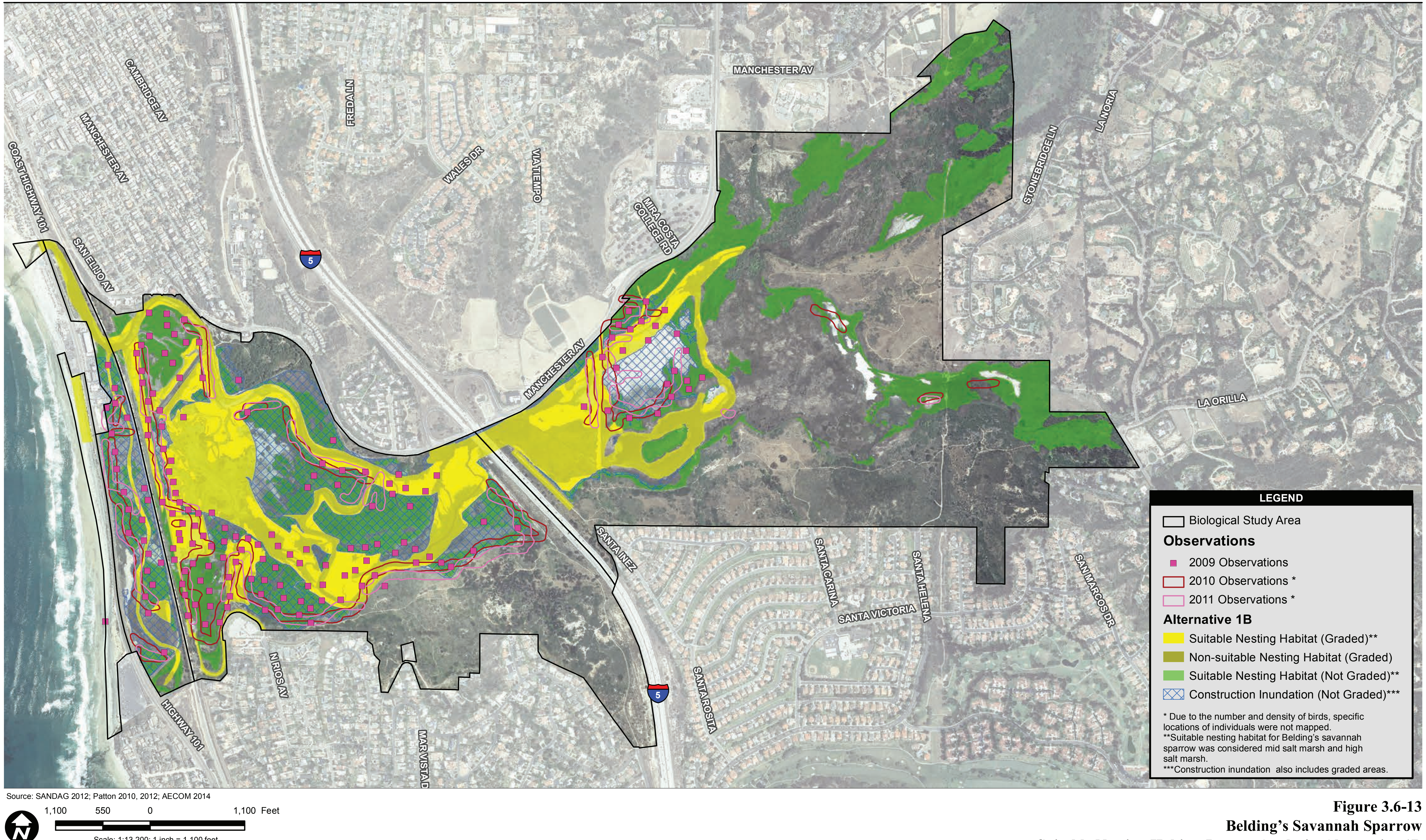

Figure 3.6-13
Belding's Savannah Sparrow
Suitable Nesting Habitat Impact Analysis, Alternative 1B

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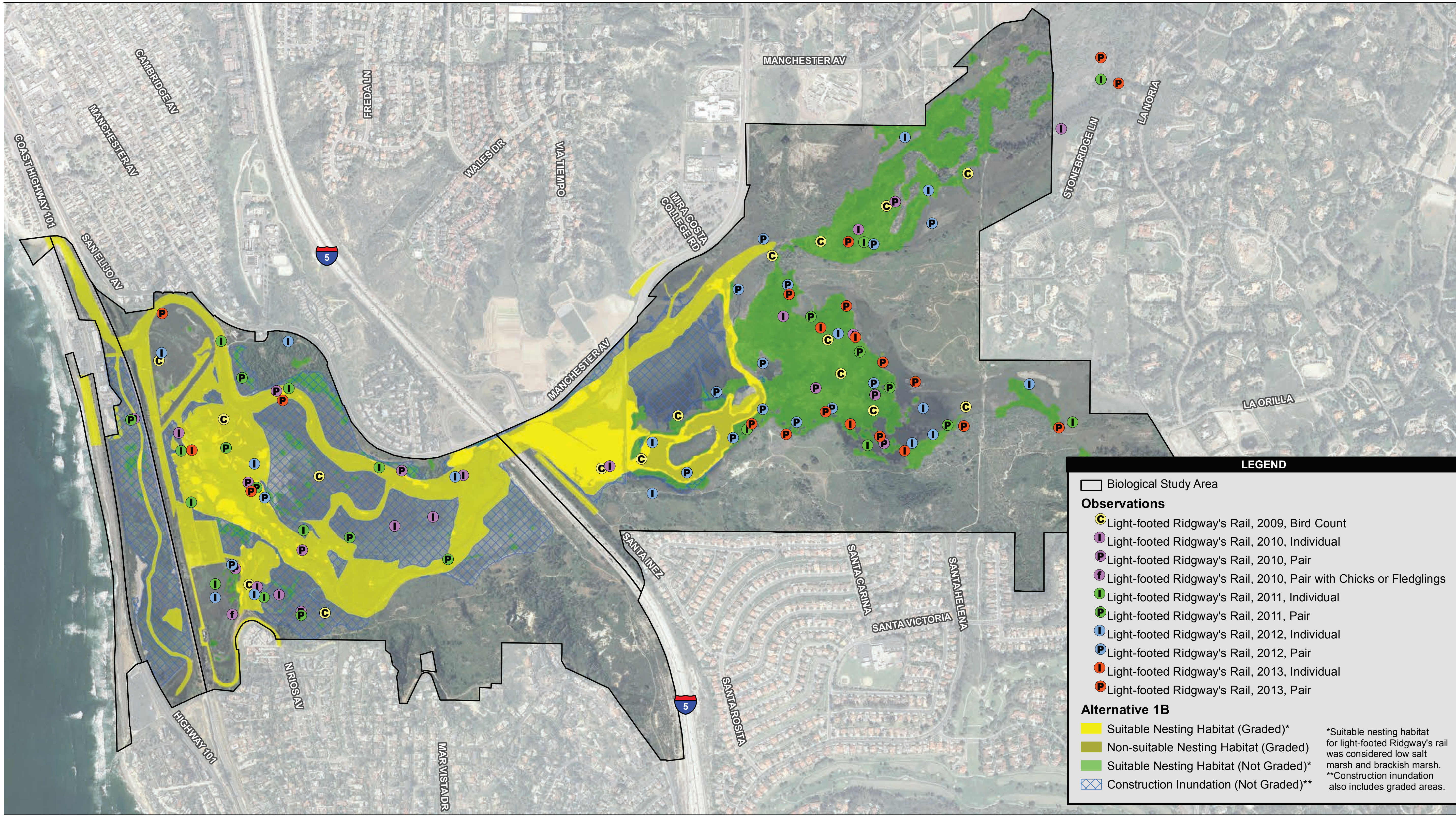

Source: SANDAG 2012; Zembal 2011, 2012; AECOM 2014

1,100 550 0 1,100 Feet

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

Figure 3.6-14
Light-footed Ridgway's Rail
Suitable Nesting Habitat Impact Analysis, Alternative 1B

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

INDIRECT

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

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

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

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

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

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

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

Long-Term/Permanent

DIRECT

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

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

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

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

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

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

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

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as "foraging" is not expected to support breeding activities.
**Under existing conditions, a portion of the nesting area is classified as salt panne.

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

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

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

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

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

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

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

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

INDIRECT

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

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

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

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

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

Wildlife Corridors/Connectivity

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

Local Ordinances/Policies/Adopted Plans

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

Alternative 1A

Sensitive Riparian and Natural Vegetation Communities

Short-Term/Temporary

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

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

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

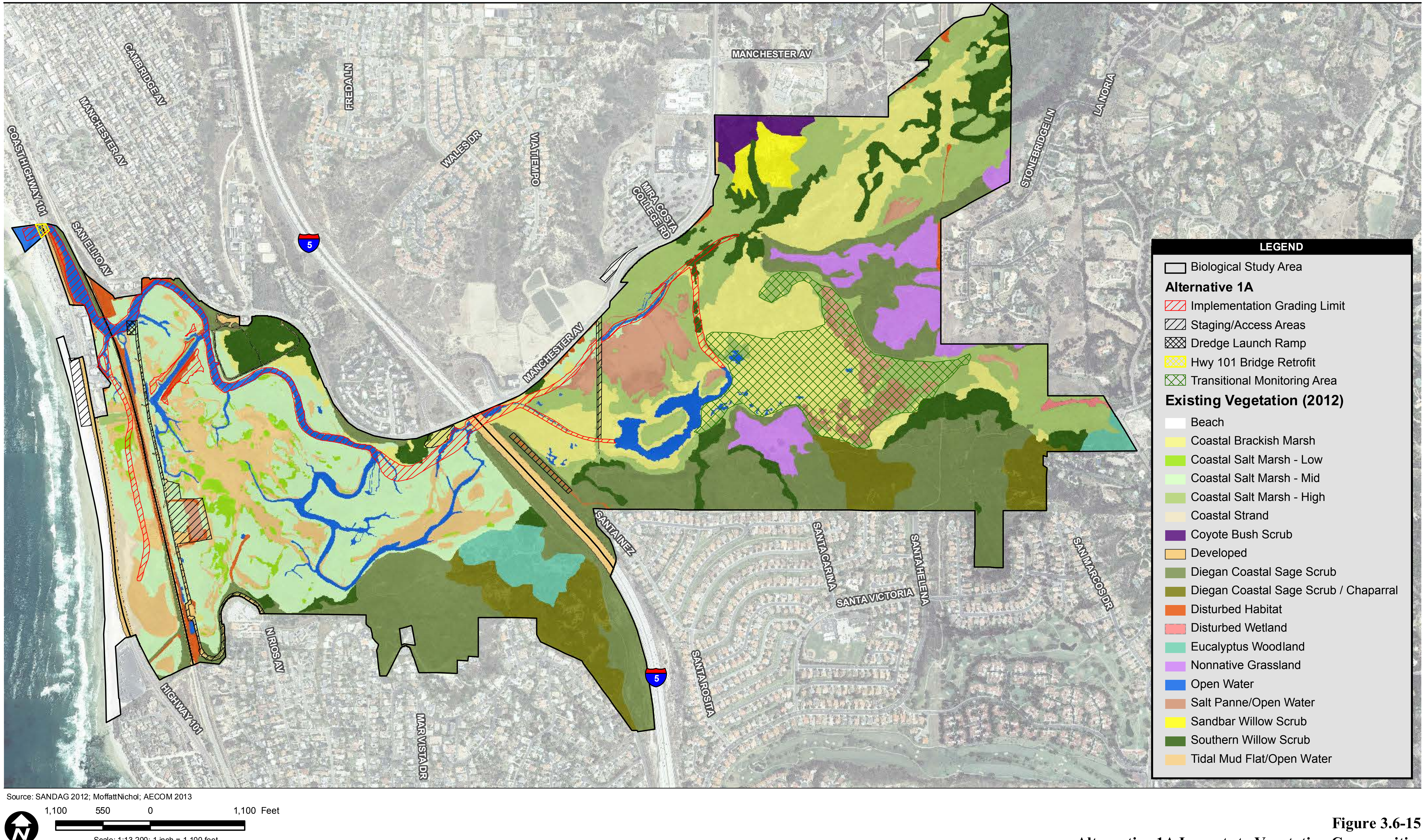

Figure 3.6-15
Alternative 1A Impacts to Vegetation Communities

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

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

USFWS Critical Habitat

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

Essential Fish Habitat

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

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

Indirect Impacts

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

Long-Term/Permanent

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

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

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

Alternative 1A differs substantially from Alternative 1B and Alternative 2A, when comparing changes in habitats over existing conditions. With implementation of Alternative 1A, mudflat and open water/channels/basins would substantially decrease over existing conditions. Creation of transitional habitats would be limited to 2 acres. Under Alternative 1A, salt marsh would substantially increase over existing conditions. Salt panne, freshwater/brackish marsh, and riparian habitats would be negligibly reduced. As with each of the alternatives, the overall acreage of habitat available for sensitive species would remain unchanged with this alternative. In addition, habitats that remain unchanged are expected to benefit from the improved hydrologic function of the lagoon. As described in Chapter 1, the lagoon habitat is rapidly transitioning over time, with continued loss of mudflat and rapid increase in salt marsh. With rapid transition to salt marsh, there is a reduction in available foraging habitat for sensitive and nonsensitive birds, which has the potential for significant ecological changes in the lagoon and is expected to dramatically change the diversity and density of wildlife that the lagoon can continue to support. With implementation of Alternative 1A, the project would result in slightly improved hydrologic function, but it would not increase foraging habitat or reverse the rapid changes that are occurring under existing conditions. Species-specific impacts associated with the changes proposed under Alternative 1A are evaluated below. **With improved lagoon ecology and no overall loss of lagoon resources, impacts to sensitive vegetation communities with project implementation of Alternative 1A are considered less than significant and not substantially adverse (Criterion A).**

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

USFWS Critical Habitat

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

Essential Fish Habitat

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

Jurisdictional Waters and Wetlands

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

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

Sensitive Species

Flora

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

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

Fauna

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

SHORT-TERM/TEMPORARY

DIRECT

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

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

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

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

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

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

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as "foraging" is not expected to support breeding activities.
**Under existing conditions a portion of the nesting area is classified as salt panne.
*** Please note that no temporary inundation impacts are associated with Alternative 1A as extensive controlled inundation would not be required.

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

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

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

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

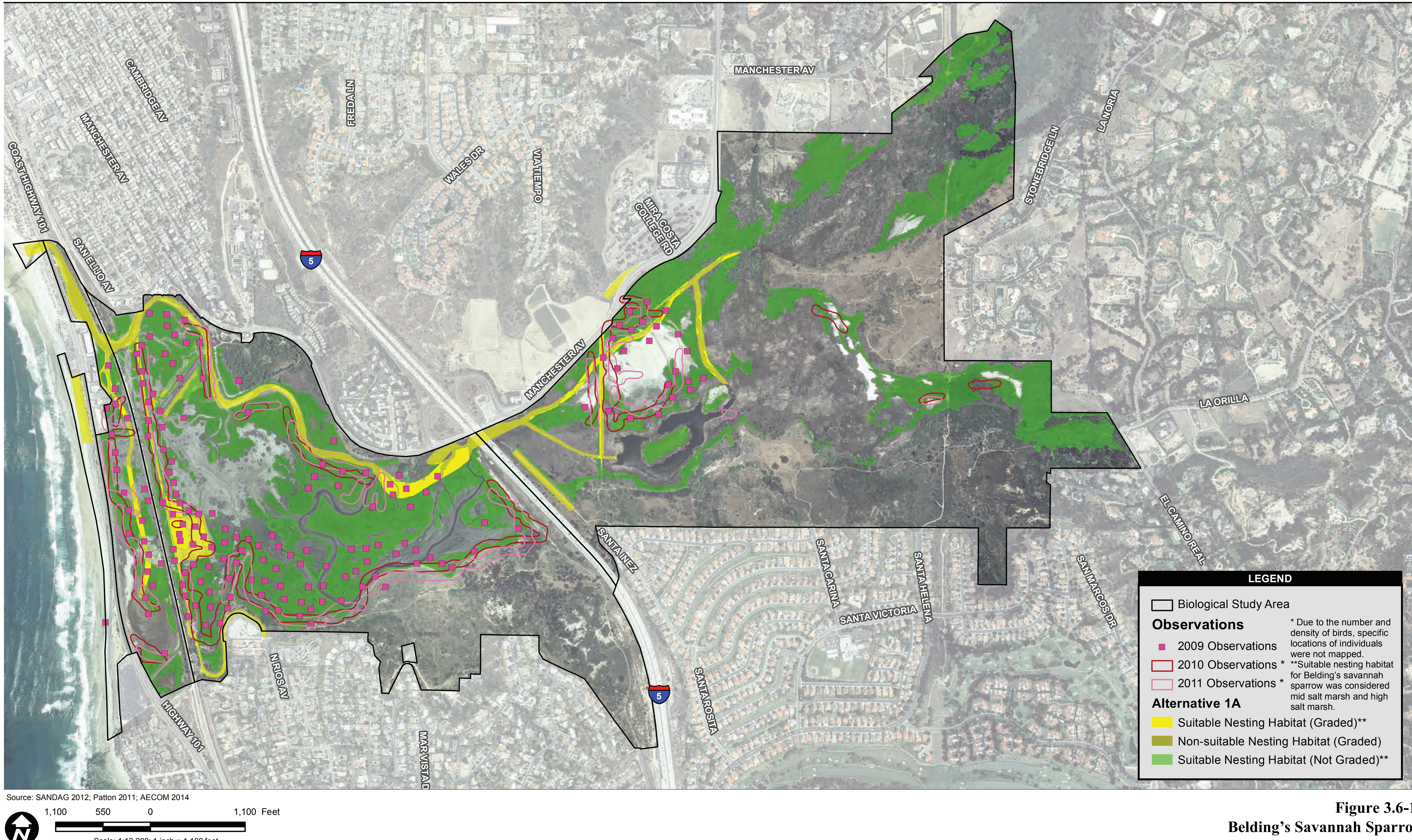

Figure 3.6-16
Belding's Savannah Sparrow
Suitable Nesting Habitat Impact Analysis, Alternative 1A

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

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

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

INDIRECT

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

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

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

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

As with Alternative 2A, the construction vehicle route at North Rios Avenue would experience increased noise. Two coastal California gnatcatchers have been observed along this existing access route. They are accustomed to vehicular traffic in this area from other maintenance vehicles and as such are not expected to be substantially affected by a minor increase in traffic volume and the associated vehicular noise. **Noise impacts to birds from vehicular traffic are therefore considered less than significant and not substantially adverse (Criterion C).**

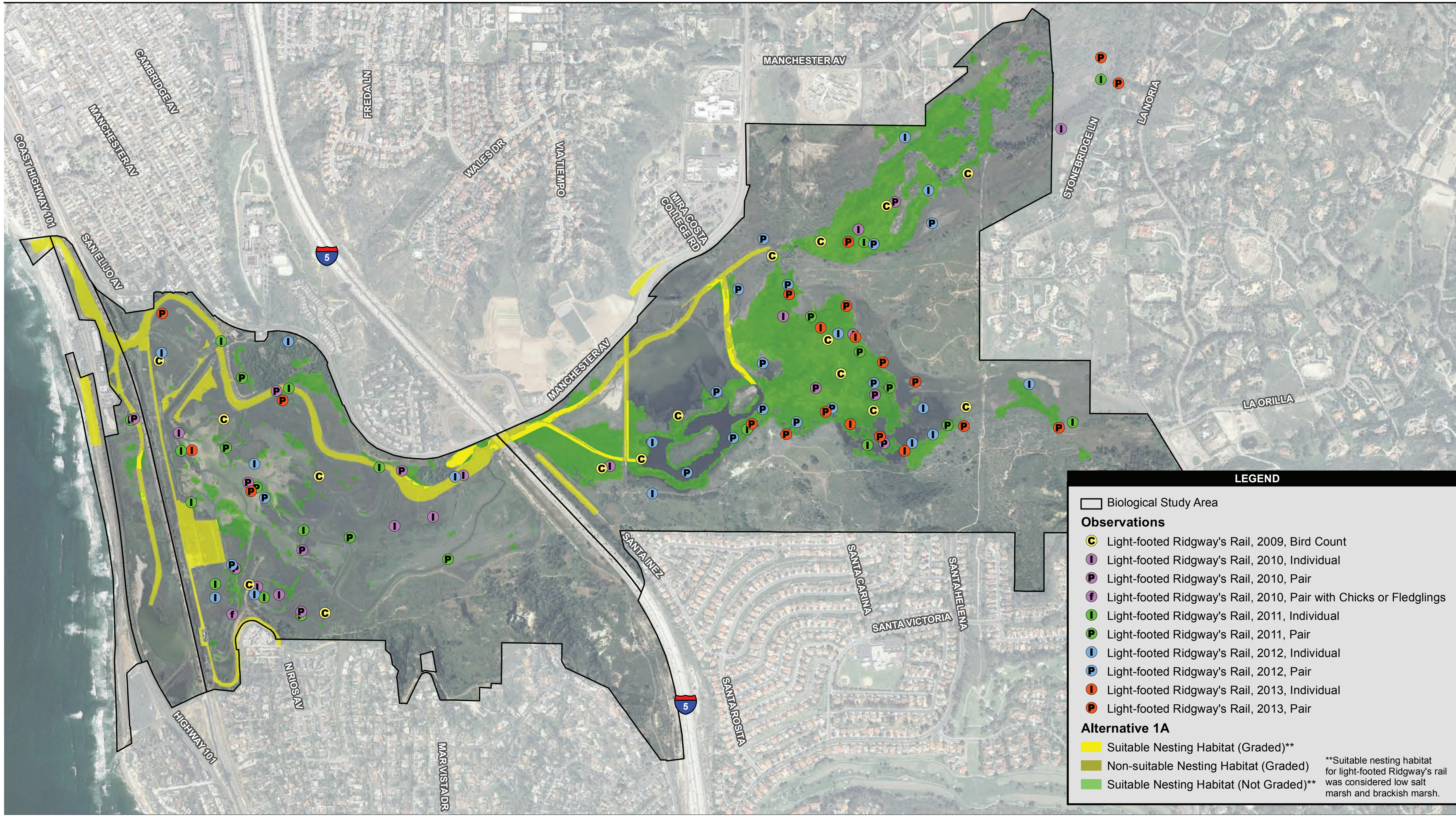
LONG-TERM/PERMANENT

DIRECT

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

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

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



Source: Landiscor 2010; Patton 2012; AECOM 2012

1,100 550 0 1,100 Feet

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

Figure 3.6-17
Light-footed Ridgways's Rail
Suitable Nesting Habitat Impact Analysis, Alternative 1A

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

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

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

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as "foraging" is not expected to support breeding activities.
**Under existing conditions, a portion of the nesting area is classified as salt panne.

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

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

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

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

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

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

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

INDIRECT

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

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

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

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

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

Wildlife Corridors/Connectivity

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

Local Ordinances/Policies/Adopted Plans

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

No Project/No Federal Action Alternative

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

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

Sensitive Vegetation Communities

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

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

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

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

*Nesting habitat is considered suitable for both breeding and foraging activities, while habitat identified as "foraging" is not expected to support breeding activities.
**Under existing conditions, a portion of the nesting area is classified as salt panne.

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

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

Rare, Threatened, or Endangered Animal Species

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

Local Ordinances/Policies/Adopted Plans

specifically represent a conflict with these plans. Efforts for preserve management and monitoring would continue consistent with the goals and objectives of these plans. N**o significant or substantially adverse impact would result (Criterion E).**

Materials Disposal/Reuse

Impacts to biological resources from materials disposal/reuse may be direct or indirect. Direct impacts to marine biological resources may occur through burial or smothering of organisms during sand placement at placement sites and stockpile locations, or equipment damage to habitats or animals during construction activities. Indirect impacts may result from decreases in marine water quality associated with sand placement activities, sediment transport from the placement site, noise from construction equipment, or interference of normal movement or behaviors of animals due to construction activities or operational effects. Direct and indirect impacts from the project on biological resources are assessed in this section.

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

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

Alternative 2A

Direct Impacts

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

Onshore

SAND PLACEMENT

Under sand placement for beach nourishment, large volumes of sand (105,000 to 300,000 cy depending on the placement site) would be placed above and through the intertidal zone that would result in burial impacts to small marine invertebrates (e.g., clams, sand crabs, worms). From the back beach to the top of the slope, where sand depths would be deeper, benthic organisms would be smothered. Organisms also would be buried under decreasing depths of sand toward the toe of the slope. The loss of benthic organisms within the placement site footprint is an expected and unavoidable impact of beach replenishment projects. Most invertebrates within the placement site footprint are not expected to survive, but studies have shown that some mobile animals are able to escape or burrow out from the outer or leading edges of the beach fills where overburden depths are generally 2 feet or less (Lynch 1994, cited in NRC 1995). However, burrowing ability substantially decreases over short time frames (Mauer et al. 1986). Conservative assumptions were used in the impact analysis, with direct impact acreage being calculated as the entire footprint from the back beach to the toe of the slope.

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

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

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

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

Pipeline/Equipment Placement

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

Table 3.6-16
Estimated Direct Impact Acreage from Sand Placement

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

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

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

Nearshore

SAND PLACEMENT

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

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

PIPELINE/EQUIPMENT PLACEMENT

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

Offshore

SAND PLACEMENT

Approximately 600,000 cy of sand would be discharged offshore within SO-5/SO-6 placement sites outside of the littoral cell. No sensitive habitat occurs within these placement sites. There is a potential for direct impacts to invertebrate and fish species due to burial by sediment placement, similar to onshore and nearshore placement sites. Sea turtles and marine mammals have the potential to use these stockpile sites, but because they are highly mobile it is unlikely they would be directly impacted due to sedimentation. Furthermore, a Marine Mammal and Turtle Contingency Plan has been included as a project design feature to further minimize potential impacts (PDF-58). Generally, potential risk for adverse effects is greater in restricted bodies of water such as narrow channels where mobile animals may not be able to avoid discharges or where passive organisms may become concentrated. Such conditions do not apply to open waters and would be expected to contribute to very low mortality rates at the stockpile sites. There would be a temporary reduction in benthic invertebrate biomass and alteration of the benthic community species composition at the stockpile sites associated with the sediment placement. As described above, most studies have reported rapid recovery within 1 year or less for sandy beach intertidal animals after beach nourishment (NRC 1995; Greene 2002; SAIC 2007b). This begins almost immediately after cessation of construction. **Therefore, direct impacts associated with offshore sand placement are expected to be short-term and less than significant. No substantial adverse impacts to habitat/species would occur (Criteria A, C, and D).**

PIPELINE/EQUIPMENT PLACEMENT

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

Indirect Impacts

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

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

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

In addition, benefits also would occur to sandy habitats after project implementation. Monitoring after the 2001 RBSP demonstrated that beach nourishment enhanced sandy beach habitat functions at several beaches. This was most noticeable at beaches that transitioned from either cobble-covered beaches supporting few biological resources or beaches with highly seasonal periods of productivity coincident with seasonal sand accretion and erosion. The primary benefit was to increase the persistence of sandy beach habitat across seasons such that habitat was suitable early in the season to support the onset of the grunion spawning season and invertebrate recruitment period. This enhancement resulted in increased invertebrate diversity earlier in the season, increased bird use across tide conditions, and enhanced habitat for grunion spawning (e.g., increased beach width and reduction in cobble) (SAIC 2006). Similar beneficial impacts would be anticipated after implementation of the SELRP.

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

Onshore

THREATENED AND ENDANGERED SPECIES

CALIFORNIA LEAST TERN

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

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

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

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

WESTERN SNOWY PLOVER

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

FORAGE REDUCTION, ALTERATION, OR MODIFICATION

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

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

No adverse effects on seabird or waterbird foraging were observed with implementation of the 2001 RBSP (AMEC 2002). Bird surveys were not specifically conducted for the 2012 RBSP within the areas of the placement sites. However, biological monitors present noted no obvious effects of discharge turbidity on bird foraging behavior or locations. Because turbidity plumes are expected to be similar to the 2001 and 2012 RBSPs, **project-related effects on seabird and waterbird foraging are expected to not be substantially adverse and to remain less than significant (Criterion D)**.

Disturbance, Displacement, or Interference

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

Artificial night lighting has the potential to disturb or attract wildlife. Grunion have been documented to spawn in the vicinity of beach disposal operations, including the 2001 RBSP. Some reports suggest that grunion spawning may be less in well-lighted areas, while other reports document spawning near lighted areas such as piers. It is not well understood to what extent grunion may be attracted or displaced from spawning at a beach from artificial lighting or other equipment-related disturbance. **Lighting impacts to grunion would be less than significant because habitat suitability assessments, monitoring during construction, and avoidance/minimization of spawning grunion would be used to minimize impacts to the species. No substantial adverse impacts would occur (Criterion D).**

Turbidity

Turbidity has the potential to indirectly impact plankton, fish, marine mammals, kelp, and vegetated reefs. Turbidity within the ocean environment is naturally variable depending on wave climate and season. Monitoring data from seven California beach nourishment projects indicate that turbidity measurements with a nephelometer (nephelometric turbidity units [NTUs]) were below or within ranges measured during storm or high wave conditions (SAIC 2007b). Turbidity would be expected to be localized to the discharge location, generally within 500 feet or less. Plumes would be expected to be largely confined within the surf zone but may be incorporated by rip currents and carried farther offshore. Because sediments are sandy with relatively large average grain size, project-related turbidity would quickly settle and plumes would be temporary.

Most placement sites would be constructed within 10 to 15 days. Therefore, exposure durations to elevated turbidity at any particular reef or other nearshore location generally would be on the order of days to a week. Exposure durations would be substantially less (e.g., minutes, hours) for mobile organisms.

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

The effects of suspended particulates on plankton are generally considered negligible because of the limited area affected and short exposure time as they drift through the affected areas. Similarly, effects on fish would be limited and temporary in nature, and a number of studies have documented variable responses by fish that range from attraction to avoidance. Pelagic fish offshore of the placement sites, and marine mammals that ventured close to shore, would not be expected to be adversely affected because the turbidity would remain localized and short term, and similar to conditions that may be experienced during storm events. No significant impacts are anticipated to plankton, fish, or marine mammals as a result of turbidity.

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

Nearshore vegetated reefs have the potential to be impacted by reduced light transmittance and siltation associated with turbidity plumes. Turbidity also has the potential to cause physiological stress, reduced feeding, or displacement of mobile marine invertebrates or fish in reef areas. Actual effects would depend on the concentration and duration of turbidity. While marine invertebrates and bottom-associated fish are generally tolerant of high turbidity such as naturally occurs during high wave or storm conditions, adverse effects may result from exposure to very high concentrations or moderate to high concentrations for prolonged periods. As noted, turbidity plumes associated with the project would be relatively small, localized, and of short duration. Furthermore, suspended sediment concentrations in turbidity plumes would be minimized by use of training dikes (PDF-51). **Therefore, turbidity impacts would not be substantially adverse and would be expected to be less than significant on reef habitat and within the distance of the expected turbidity plumes (Criteria A and D).**

SEDIMENTATION

Fill material placed on individual placement sites would eventually be washed by waves and redistributed offshore and alongshore through natural processes. There is the potential for sand introduced into the system to indirectly impact sensitive habitats and resources if sand deposits on those resources occur at sufficient depth and persistence to result in burial or degradation of those resources. To estimate potential impacts to sensitive habitats, a suite of indicator species of relatively higher quality reef habitats has been identified. As defined in Section 3.6.3, sensitive indicator species consist of surfgrass, feather boa kelp, sea fans, sea palms, and giant kelp.

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

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

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

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

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

LEUCADIA

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

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

MOONLIGHT BEACH

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

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

The inshore portion of the reef adjacent to the northern site boundary is sand influenced within 400 to 800 feet offshore under existing conditions. This is likely due to the relatively low reef heights (predominantly 1 foot or less in June 2006) being within the range of historic seasonal sand level changes, which range from 1 to 2 feet extending from the intertidal to within 800 feet offshore. Therefore, sand level increases of 0.6 foot or less would not substantially bury hard-bottom but may contribute to seasonal sand scour of low-lying reef with limited resource development (e.g., turf algae). Those levels would be expected to have a limited effect since reef heights with sensitive indicators predominantly range between 1 and 2 feet.

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

CARDIFF

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

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

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

SOLANA BEACH

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

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

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

TORREY PINES

The Alternative 2A volume of sand and location of the Torrey Pines placement site are the same as with the 2001 RBSP. A localized reef outcrop with surfgrass occurs offshore of the placement site. More developed reefs with understory algae and surfgrass are located approximately 1,100 feet downcoast and 1,400 feet upcoast of the site. Kelp bed habitat is nearly 1 mile from the site. Nearshore reef heights of less than 1 foot mainly have turf algae, while higher relief reef, generally ranging from 1 to 3 feet, supports surfgrass and understory algae. Modeling predicts persistent sand level increases on the order of 0.5 to 0.7 foot and seasonal increases of up to 0.8 to 1 foot that would decrease over time and distance from the placement site. Partial sedimentation of reefs may occur but would not be expected to substantially bury reefs with sensitive indicator species.

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

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

SUMMARY OF INDIRECT SEDIMENTATION IMPACTS

Beach sand placed on placement sites would eventually be washed by waves and redistributed offshore and alongshore through natural processes. There is the potential for sand introduced into the system to indirectly impact sensitive habitats and resources if sand deposits on those resources occur at sufficient depth and persistence to result in burial or degradation of those resources. Generally, sedimentation at profiles was less than 1 foot, with the primary exception being in the vicinity of San Elijo. In addition, even when sediment levels exceeded 1 foot, it rarely persisted for more than 1 year.

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

OTHER CONSTRUCTION ISSUES

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

Nearshore

FORAGE REDUCTION, ALTERATION, OR MODIFICATION

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

DISTURBANCE, DISPLACEMENT, OR INTERFERENCE

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

TURBIDITY

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

SEDIMENTATION

Analytical modeling of the ebb bar indicated there may be an area that measures approximately 2,200 feet alongshore and 1,600 feet cross-shore off Cardiff State Beach that would be affected by increased sedimentation due to sand placement at Cardiff-nearshore. The estimated depth of the sediment within that area would be approximately 3 feet if it were a three-dimension rectangle with no variation. However, it would be more likely that sediment thickness would vary with a maximum thickness in the center and minimum thickness along the edges. For example, the center may be 6 feet thick while the edges may be 0 feet thick. Biological resources that could be affected by the increased sedimentation are those understory and giant kelp plants present on the riprap associated with the San Elijo Outfall. Based on historical kelp canopy cover, up to 6 acres of understory and/or giant kelp plants could be affected. However, impacts to these resources are not included in this analysis since the intent of the riprap is to support and protect the outfall pipe, and it was not created as an artificial reef to enhance biological productivity. In addition, the San Elijo Joint Powers Authority is under permit to maintain and remove kelp plants at this location to ensure the integrity of the riprap is not compromised. **No substantial adverse impacts would occur, and impacts would remain less than significant (Criterion A).**

OTHER CONSTRUCTION ISSUES

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

Operation of equipment and support vessels has the potential to introduce contaminants to the marine environment from minor spills and leaks. The potential for accidental discharge also could result from collision with or by another vessel. The probability of both types of accidental discharges is considered low. If a spill occurred, the contractor would utilize BMPs to prevent long-term degradation of water quality. For these reasons, **impacts to biological resources from accidental discharges would be expected to be less than significant (Criterion A). No substantial adverse impacts would occur.**

Offshore

FORAGE REDUCTION, ALTERATION, OR MODIFICATION

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

DISTURBANCE, DISPLACEMENT, OR INTERFERENCE

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

TURBIDITY

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

The effects of suspended particulates on plankton are generally considered negligible because of the limited area affected and short exposure time as they drift through the affected areas. Similarly, effects on fish would be limited and temporary in nature, and a number of studies have documented variable responses by fish that range from attraction to avoidance. Pelagic fish offshore of the placement sites, and marine mammals that ventured close to shore, would not be expected to be adversely affected because the turbidity would remain localized and short term, and similar to conditions that may be experienced during storm events. **No substantial adverse or significant impacts are anticipated to plankton, fish, or marine mammals as a result of turbidity (Criteria A and D).**

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

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

OTHER CONSTRUCTION ISSUES

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

Essential Fish Habitat

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

Alternative 1B

Direct Impacts

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

Table 3.6-18
Estimated Direct Impact from Sand Placement

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

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

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

Cardiff-nearshore

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

<u>Indirect Impacts</u>

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

Alternative 1A

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

No Project Alternative

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

Impact Conclusion

The SELRP is, by design, a project for the long-term improvement of water quality and health/diversity of biological resources. Numerous project design features are incorporated into the project to minimize impacts during construction and most potential impacts to biological resources would be less than significant. However, during construction, there would be significant impacts to sensitive vegetation communities and resident marsh birds where temporary loss of habitat would exceed 50 percent. In addition, short-term significant and substantially adverse impacts to birds may result from indirect noise impacts. There would be no long-term significant or substantial adverse impacts; ultimately, the noise levels would reduce to existing levels where these sensitive species are residents, and habitat diversity would facilitate stable populations of these species.

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

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

3.6.4 Avoidance, Minimization, and Mitigation Measures

Lagoon Restoration

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

construction specifications and other agreements. Because this project is a restoration project focused on improving the water quality and biological diversity of the lagoon, substantial time and effort went into the planning for, and avoidance of, short-term and long-term impacts to species and their habitats. Significant short-term impacts to vegetation communities were identified with Alternative 2A and Alternative 1B, due to the loss of over 50 percent of a sensitive habitat community for over 12 months.

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

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

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

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

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

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

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

> Electric dredge – The project currently proposes the use of a diesel dredge and/or an electric dredge. The potential benefit of requiring electric dredge use to reduce noise levels adjacent to habitats for sensitive bird species was evaluated. However, as described in Section 3.12, noise measurements from an electric dredge (estimated 71 dBA) and a diesel dredge (73 dBA) do not substantially differ. Therefore, the sole use of an electric dredge was not considered an effective mitigation measure for noise impacts to sensitive species (see Section 3.12 Noise).
>
> Noise walls – In an upland environment, temporary noise walls are often required as mitigation, and constructed between the construction site and adjacent habitat. These walls are typically 6 feet high and constructed of plywood with strong footings to support the wall over the life of construction. This physical buffer can lower noise levels to below a level of significance. Because the dredge would be moving its way through the lagoon throughout construction, and the habitat of concern is directly adjacent marsh habitat, an intervening noise wall would have to be constructed in mucky conditions. The wall would be required along a substantial length of the lagoon on both north and south sides. Construction of the walls, with footings in a wet environment and strength for 2-year-long duration, would result in direct impacts to adjacent habitat that would otherwise not be touched, and could prevent/hinder marsh species from readily accessing the lagoon itself. The dredge would be mobile but the wall would not. The impacts associated with construction of the noise walls, and the introduced barrier, would reduce or eliminate the value of this mitigation measure. Noise walls are considered an infeasible mitigation measure.
>
> Alternative work schedule (outside nesting season) – An alternative work schedule was considered requiring work to be conducted outside of the bird nesting season. This would avoid increased noise during the most sensitive time period for these marsh species as construction would completely halt February 15 through September 1. The stop and start

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

Materials Disposal

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

3.6.5 Level of Impact after Mitigation

Lagoon Restoration

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

NEPA Conclusion: Short-term substantial adverse impacts to sensitive vegetation and Belding’s savannah sparrow would be unavoidable with implementation of Alternative 2A and Alternative 1B. Noise impacts to nesting birds would be unavoidable with implementation of Alternative 2A, Alternative 1B, and Alternative 1A. As described above, even with the numerous project design features to reduce these impacts, they remain substantially adverse. As described above, although the restoration alternatives would have short-term impacts, the long-term ecological benefits would be substantial relative to the No Project/No Federal Action Alternative. No long-term substantial adverse impacts were identified for any of the project alternatives.

Materials Disposal

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

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

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3.7 CULTURAL RESOURCES

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

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

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

Under CEQA, important significant resources are those that meet one or more of the evaluation criteria for the California Register of Historical Resources (CRHR). The CRHR criteria are modeled after the NRHP criteria. Sites that are eligible for the NRHP are automatically considered eligible for the CRHR. CEQA also applies to archaeological resources that do not meet the criteria of a historical resource, but do meet the definition of a unique archaeological resource in PRC Section 21083.2, as follows:

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

(1) Contains information needed to answer important scientific research questions and a demonstrable public interest in that information.

(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.

(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

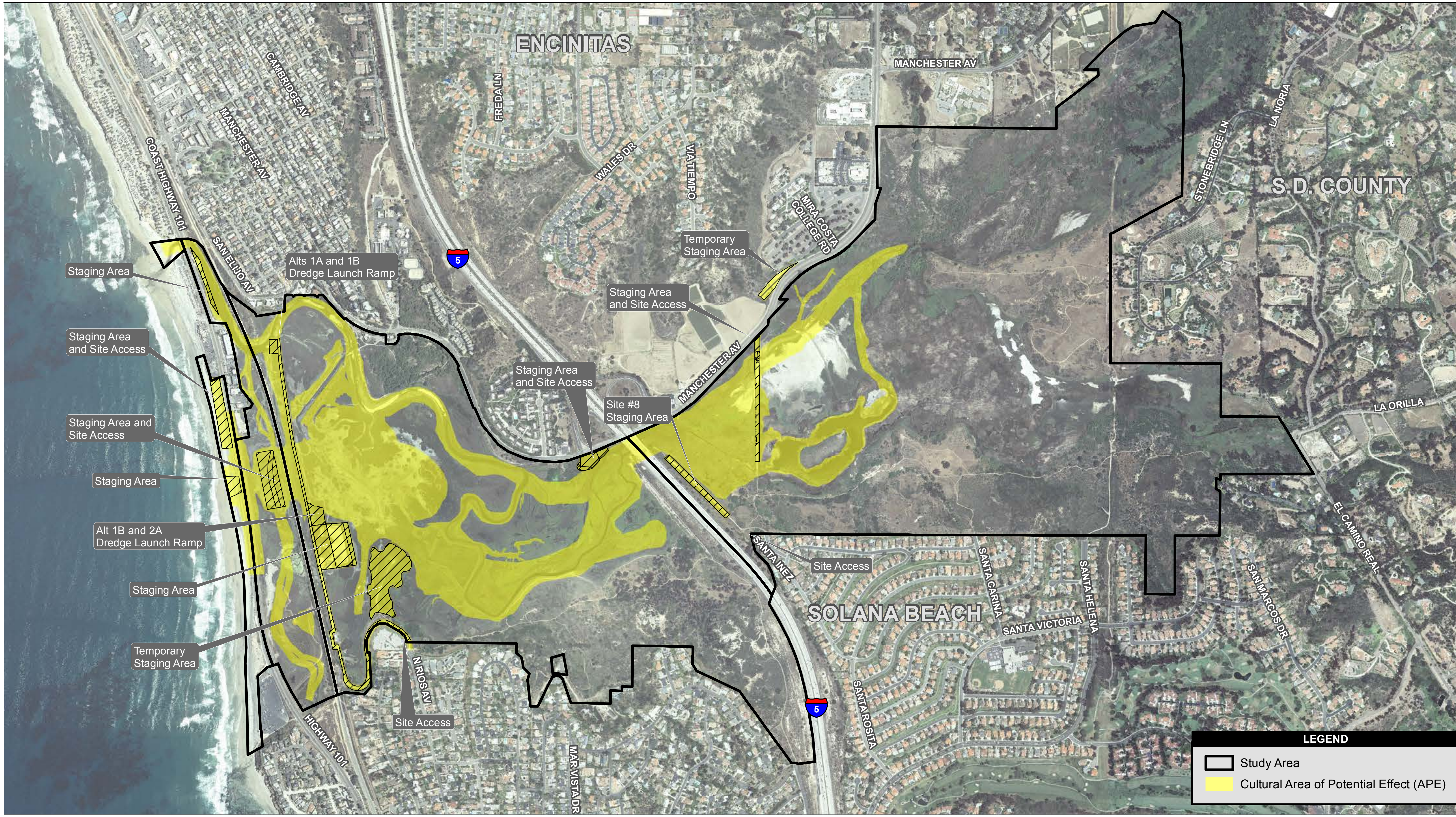
The assessment of the project's potential to have an adverse impact on cultural resources is based on the baseline conditions described in the following technical resource study: "*Archaeological Survey in Support of the San Elijo Lagoon Restoration Project Environmental Impact Report/Environmental Impact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

3.7.1 AFFECTED ENVIRONMENT

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

Regional Prehistory and History

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



Source: SANDAG 2012; DPR; City of Encinitas 2010; AECOM; MoffattNichol 2013

1,100 550 0 1,100 Feet

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

Figure 3.7-1
Cultural Area of Potential Effect (APE)

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

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

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

Existing Cultural Records Search Results

A records and literature search was conducted in July 2012 at the SCIC to provide information on previous cultural resources surveys and known previously recorded cultural resource sites within a 300-foot radius of the cultural study area. Also consulted were the 2012 RBSP EA/Final EIR (SANDAG 2011), addressing sites proposed as part of the materials disposal/reuse component, and a cultural resources management technical report for San Elijo Lagoon (Byrd et al. 2004). Information from the San Elijo Lagoon Double Tracking project cultural report regarding the NRHP assessment of cultural resources within the railroad improvements footprint was provided by SANDAG (SANDAG 2014). Although it did not provide information regarding cultural resources, a geotechnical sampling study (URS 2012) was consulted for depths of sediments in the lagoon. The 2012 RBSP provided information on the presence/absence of cultural resources at offshore placement sites and nearshore and onshore receiver sites for both programs. The study by Byrd and others documents the results of National Science Foundation (NSF)-funded archaeological and paleontological investigations on prehistoric hunter-gatherers at San Elijo Lagoon. The investigations included a paleoreconstruction based on a coring program and other environmental data, and archaeological excavations and artifact analyses of eight prehistoric shell middens or shell scatters in the lagoon. The focus of the coring program, conducted in the eastern and upper portions of the lagoon, was to provide data regarding paleoenvironments, also revealed sediment deposits ranging from approximately 35 feet to 105 feet in depth in those areas. The research sources revealed that much of the cultural study area has undergone intensive pedestrian survey for cultural resources, resulting in the identification of 21 prehistoric archaeological sites, seven historic archaeological sites, two sites with both prehistoric and historic components, and four historic structures. No isolated artifacts were previously recorded within the cultural study area.

Archaeological Resources

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

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

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

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

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

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

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

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

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

Native American Consultation

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

Historic Structures

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

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

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

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

3.7.2 THRESHOLDS OF SIGNIFICANCE

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

> The quality of significance in American history, architecture, archeology, and culture is present in districts, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. That are associated with the lives of persons significant in our past; or
>
> C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

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

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

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

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

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

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

A. Directly, indirectly, or cumulatively damage or destroy a significant historic or archaeological resource as defined above by NHPA and CRHR, and criteria for eligibility for the San Diego County Local Register; or

B. Cause a direct or cumulatively substantial change in the significance of a historical resource. Substantial adverse change in the significance of a historical resource includes demolition, destruction, relocation, or alteration of the resource (archaeological, historical, or human remains) or its immediate surroundings to the extent that the significance of the resource is materially impaired.

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

3.7.3 ENVIRONMENTAL CONSEQUENCES

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

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

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

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

Lagoon Restoration

Alternative 2A

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

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

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

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

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

Alternative 1B

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

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

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

Alternative 1A

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

No Project/No Federal Action Alternative

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

Materials Disposal

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

Alternative 2A

Offshore

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

Nearshore

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

Onshore

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

Alternative 1B

This alternative would rely on the same offshore, nearshore, and onshore scenarios as Alternative 2A; there are no previously recorded cultural resources in these locations; **thus,** placement of materials **would have no significant or substantial adverse direct or indirect impacts to cultural resources or NRHP- or CRHR-eligible resources (Criteria A and B).**

Alternative 1A

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

3.7.4 Avoidance, Minimization, and Mitigation Measures

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

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

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

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

- Ground-disturbing construction activity shall be temporarily halted by the project archaeologist and/or Native American monitor at the location of the find and redirected elsewhere until the find is assessed by a qualified archaeologist for eligibility to the NRHP and CRHR.

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

Evaluation procedures would include:

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

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

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

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

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

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

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

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

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

3.7.5 Level of Impact after Mitigation

The above CEQA mitigation measures would provide for:

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

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

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

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3.8 PALEONTOLOGICAL RESOURCES

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

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

3.8.1 AFFECTED ENVIRONMENT

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

Paleontological Resources, San Diego County California (Deméré and Walsh 2003) provides generalized potential sensitivity for different geologic deposits within San Diego County. The proposed project is located within the Coastal Plain region of the Peninsular Ranges Province. The Coastal Plain region is underlain by a “layer cake” sequence of marine and nonmarine sedimentary rock units that record portions of the last 140 million years of earth history. Over this period of time, the relationship of land and sea has fluctuated drastically such that today we have ancient marine rocks preserved up to elevations of around 900 feet above sea level and ancient river deposits as high as 1,200 feet. Faulting related to the local La Nación and Rose Canyon fault zones has broken up this sedimentary sequence into a number of distinct fault blocks in the southwestern part of San Diego County, while in the northern area the effects of faulting are not as great and the rock units are relatively undeformed (Deméré and Walsh 2003). Descriptions of specific formations found within the restoration area are summarized below in Table 3.8-1.

Table 3.8-1
Paleontological Formation Characteristics and Sensitivity

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

Source: Deméré and Walsh 2003

Known Paleontological Resources

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

3.8.2 CEQA Thresholds of Significance

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

A. Directly or indirectly destroy a unique paleontological resource or site; or

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

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

3.8.3 Environmental Consequences

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

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

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

Alternative 2A

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

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

Generally, proposed staging areas and access roads would be sited at existing access points and previously disturbed areas, minimizing site preparation requirements. The majority of necessary site preparation would include minor grading and clearing to create level surfaces or expand usable area. However, some vegetation clearing, grading, and fill to widen the existing access road to accommodate construction and maintenance vehicles and equipment would be necessary. The proposed access road along the southern boundary of the lagoon, which would provide access from North Rios Avenue, would be partially located outside of the lagoon basin. The Delmar Formation borders the entire southern boundary of the lagoon and the access road could extend into areas underlain by this highly sensitive paleontological formation. Paleontological resources have not been recovered in this immediate area (Deméré 2012b). Surface grading to improve (flatten or widen) the existing roadway may be required in focused areas, although it would be limited to shallow grading along the ground surface and would result in less than 5,000 cy of earth moved. The highly sensitive Delmar Formation occurs at or near the surface in this area, so excavation of any depth may have the potential to impact paleontological resources. Thus, these shallow grading activities may disturb the underlying sensitive formation, resulting in a potential for paleontological resources to be damaged or destroyed. **Grading within the Delmar Formation could destroy a unique paleontological resource or affect an area of underlying sensitive parent material with moderate to high sensitivity, and impacts are potentially significant under CEQA (Criteria A and B).**

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

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

Alternative 1B

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

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

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

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

Alternative 1A

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

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

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

No Project/No Federal Action Alternative

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

3.8.4 Avoidance, Minimization, and Mitigation Measures

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

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

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

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

3.8.5 Level of Impact after Mitigation

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

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

3.9 VISUAL RESOURCES

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

3.9.1 AFFECTED ENVIRONMENT

San Elijo Lagoon Study Area

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

There are isolated areas of altered or developed lands within the lagoon, including the Nature Center at the very northern edge of the lagoon and accessed by Manchester Avenue, and abandoned sewage settling ponds just east of the railroad. Numerous dirt trails traverse the lagoon site, mostly on the upland edges of the Reserve. These trails appear as brown linear features crisscrossing the greens of the vegetation, but they are relatively narrow and modest in size. Because the SELC has an extensive education and community outreach focus, plus the lagoon is an attractive feature for birders and naturalists, a large number of visitors of all ages come to the lagoon. Some electrical utilities also cross the site north to south and present signs of human intrusion (see Section 3.14 Public Services and Utilities). These features have not substantially diminished the overall character of the large, open, natural system.

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

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

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

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

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

Materials Disposal Study Area

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

<u>Moonlight</u>

The proposed Moonlight placement site is located at the foot of B and C streets at Moonlight Beach, north of the proposed project. The proposed site is approximately 770 feet long (0.1 mile). Residential uses occur adjacent to the site, to the north and south. The beach area is relatively flat but quickly slopes up to the east, north, and south. Public access is found at Moonlight Beach (B and C streets) and south at the D Street stairway. Popular surf breaks along this reach include D Street, Boneyards, and Swami’s. The site viewscape contains a wider sand area and a park because in this location the bluffs trend easterly and open up to allow Cottonwood Creek to drain into the ocean. The City of Encinitas places approximately 1,000 cy of sand annually on Moonlight Beach to augment the naturally occurring sand that erodes into the ocean. North and south of the park, there is a narrow sand shelf from the cliffs to a cobble slope, then sand sloping to the water. Riprap has been placed at the base of the bluffs to protect residential structures and intermittent access stairs. Except when modified by projects such as the 2001 RBSP or 2012 RBSP, high tide comes to the base of the bluffs and the limited sandy beach is not visible. The Moonlight site would have a combination of viewers from private residences, a popular public access, a park, and the beach.

Leucadia

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

Cardiff

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

Solana Beach

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

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

Torrey Pines

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

Light and Glare

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

3.9.2 CEQA Thresholds of Significance

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

A. Have a substantial adverse effect on a scenic vista or on valued focal points from public roads, trails, scenic highways, or recreational areas;

B. Substantially detract or contrast with the existing visual character or quality of the site and its surroundings;

C. Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway; or

D. Create a new source of substantial light or glare, which would adversely affect daytime or nighttime views in the area.

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

3.9.3 ENVIRONMENTAL CONSEQUENCES

Overview of Methodology

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

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

Sensitive Viewers

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

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

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

Table 3.9-1
List of Key Views

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

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

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

Table 3.9-2
Representative Viewers at Materials Placement Sites

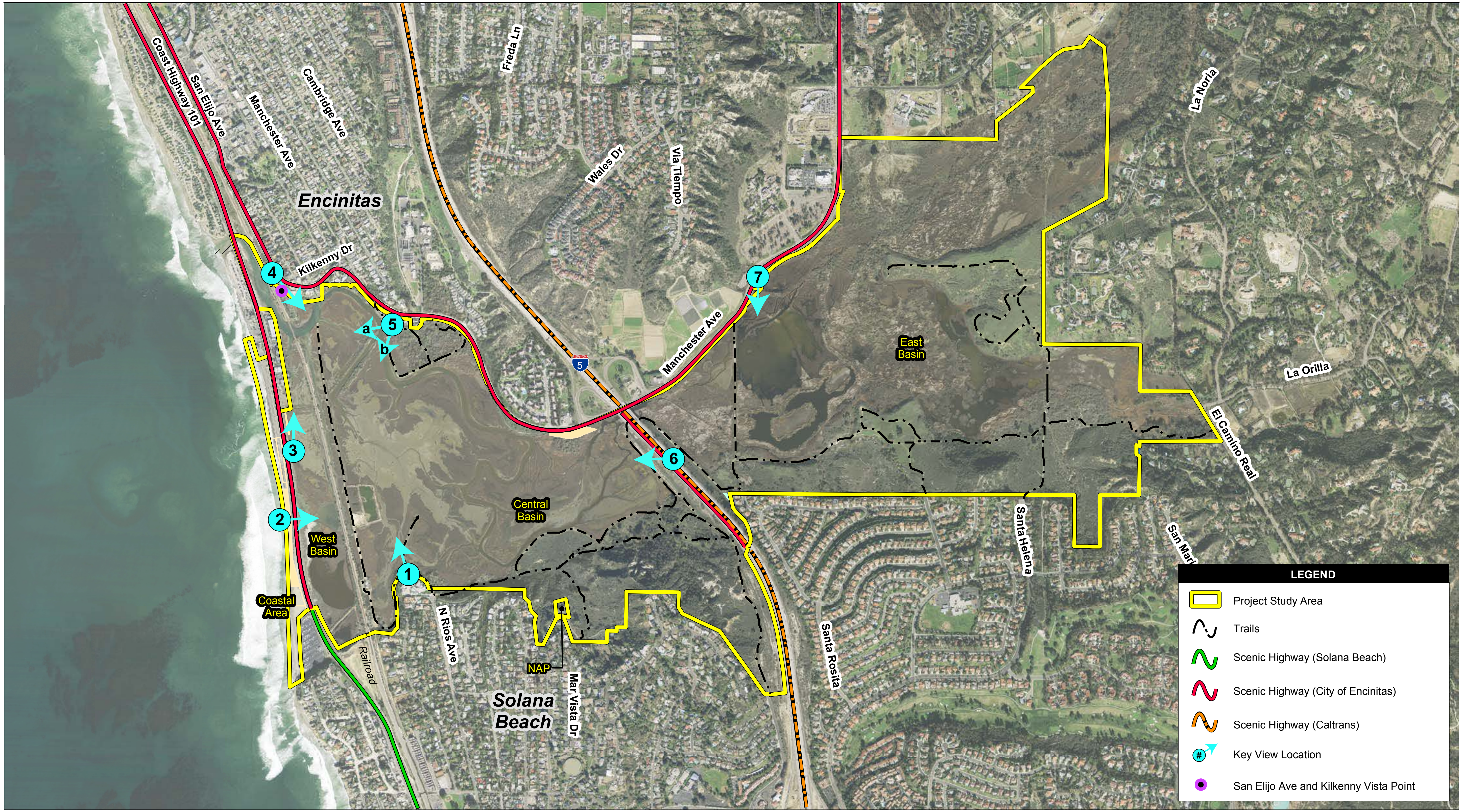
Location	Representative Viewers	Sensitivity
Moonlight	Park users Beach–goer Residential viewers (private views)	High to moderate
Leucadia	Beach–goer Residential viewers on hilltop homes (private views)	High to moderate
Cardiff	Beachgoer Scenic driver and cyclist Restaurant patrons Residential viewers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

Lagoon Restoration

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

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

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



Source: DigitalGlobe 2008; SanGIS 2008; SANDAG 2008

0.25 0.125 0 0.25 Miles

Scale: 1:15,000; 1 inch = 1,250 feet

Figure 3.9-1
Scenic Resources and Location of Key Views

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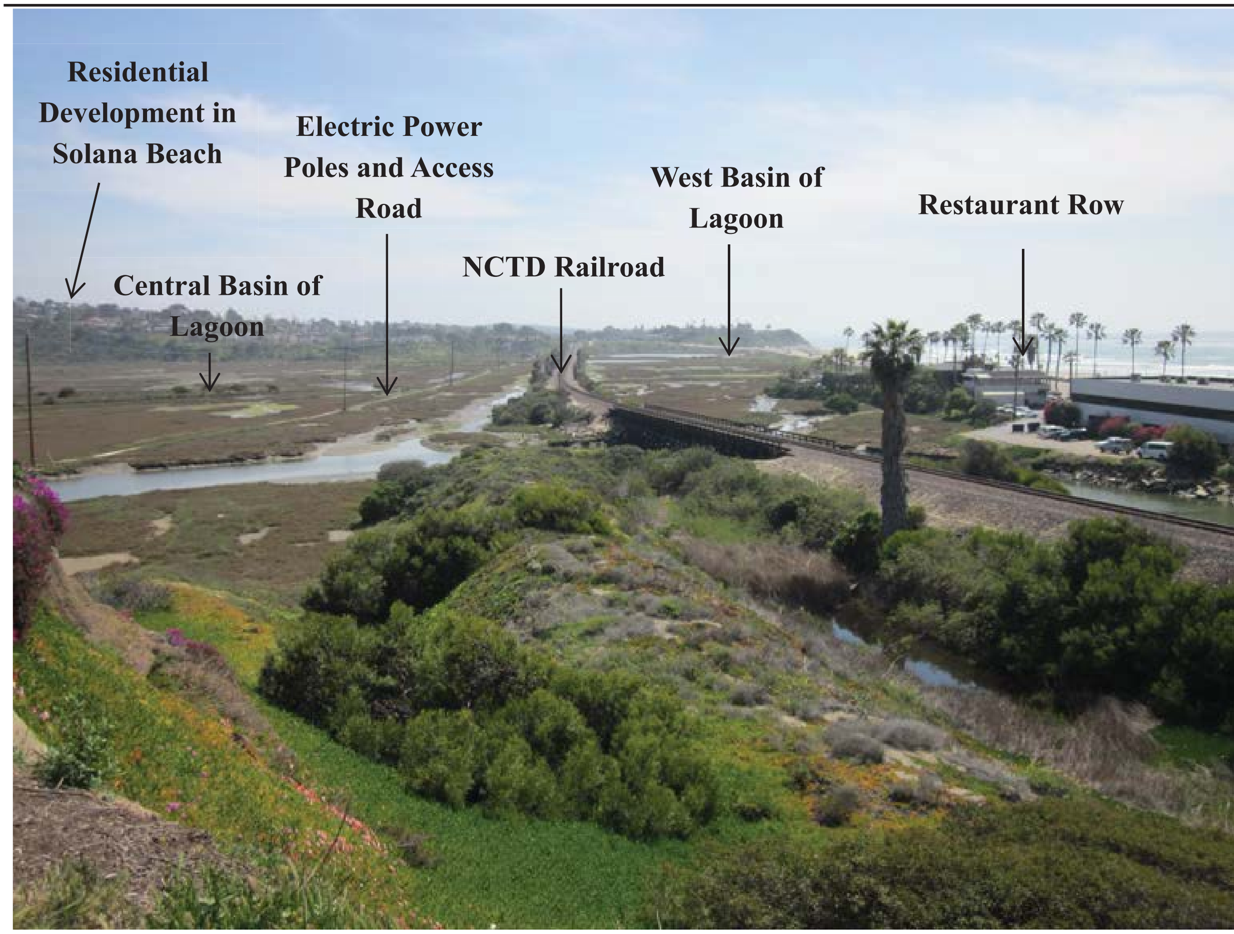
Key View 1 - View from the trail looking north across the central and west basins of the lagoon

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

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

Key View 3 – View from Highway 101 looking north

Figure 3.9-3
Key View 2 and Key View 3



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

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

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

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

Figure 3.9-5
Key View 5 – Nature Center

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

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

Figure 3.9-6
Key View 6 and Key View 7

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

Key View 1 – Alternative 2A Visual Simulation

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

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

Key View 1 – Alternative 1B Visual Simulation

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

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

Alternative 2A

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

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

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

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

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

The project would result in some temporary new light sources during 24-hour construction activities, but they would be periodic and small scale. Some construction activities would be restricted to daytime hours, but some activities require operation 24 hours a day to remain efficient (e.g., dredging activities). Additionally, activities like materials delivery may be scheduled for nighttime hours. It would be necessary to have 24-hour dredging operations over the course of the project. The light sources necessary during nighttime dredging operations would include illumination of the immediate surrounding area of work (both at the dredge in the water at at the landing point at the staging areas) and lighting contained within the enclosed cabin area. Lighting would be comparable to bright street lights. The lights would be downshielded to direct the light down toward the area of work and minimize spillage or glare (PDF-7). A spotlight on the dredge may be used if anchors need to be reset (up to three times per night). In addition to the lights from the dredge, the crew boats delivering dredge personnel to the dredge at the shift change during dark hours (generally around 11 p.m. and 6 a.m.) would have a spot light used to temporarily illuminate the immediate boarding area and waters in front of the boat while transiting to and from shore and dredge plant. Lighting at construction launch or staging areas may also be necessary to facilitate nighttime activities, such as material deliveries, and would also be similar to a street light directed toward the work area. The staging areas would be immediately east of Coast Highway 101 and one is near the already well-lit Restaurant Row. Some temporary lighting may also be required at booster pump locations during service and short-term checking by operations personnel. Although the lighting would be noticeable and visible to surrounding viewers and may appear out of place within the unlit lagoon area, the area that would be lit would be localized and focused on the immediate work area. The nighttime lighting would not create a substantial area of brightly illuminated space and would be of the scale of typical street lighting. The lights are not of a height or intensity that allows for expansive spreading or spill of light across a wide area. The light source on the dredge would move slowly throughout the lagoon as dredging progresses from one location to another and would not stay at one location for an extended period of time. The lighting at the staging areas would be stationary, but utilized primarily for intermittent staffing transfers. The nighttime lighting would only be necessary during dredging activities that require 24-hour operations (10 months in Phase 1, 7 months in Phase 2, and 7 months in Phase 3). For these reasons, **the temporary light and glare impact would not be substantially adverse and would be less than significant (Criterion C).**

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

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

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

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

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

Alternative 1B

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

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

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

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

Alternative 1B would require annual inlet maintenance under Coast Highway 101 and in the channel underneath the railroad. Additional channel maintenance and adaptive management activities may occur in other focused areas of the lagoon. Inlet maintenance would be very similar to routine maintenance that currently occurs in these locations at the existing inlet, which is moderately visible to beachgoers near the inlet and drivers along Coast Highway 101. As described for Alternative 2A, other maintenance activities would generally occur via a small dredge in open water with the existing visual elements of Coast Highway 101, traffic, trains, and other infrastructure in the background. Annual maintenance is expected to take approximately 4 weeks to complete. The temporary contrast of the construction equipment in this visual setting would be moderate and the vast majority of the lagoon would remain unaffected during maintenance. Therefore, **the impact would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

Alternative 1A

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

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

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

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

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

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

No Project/No Federal Action Alternative

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

Materials Disposal/Reuse Sites

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

The visual changes associated with the materials disposal/reuse component, including construction equipment and pipelines on the beach would only occur during construction activities, resulting in temporary visual impacts. Once onshore material placement is completed, the placement material would be similar to the existing beach and any discoloration of the sediment would be short term (typically 1 to 4 years) and not a substantial degradation of the overall sandy beach appearance. The placement material would be washed by waves, exposed to the sun, and eventually mixed with the existing sand to minimize potential contrast. This nourishment material is a beneficial enhancement of the beach because sand is preferable to cobble both visually and recreationally.

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

Alternative 2A

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

<u>Offshore Stockpiling</u>

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

<u>Nearshore (Inside Littoral Cell)</u>

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

<u>Onshore (Beach Placement)</u>

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

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

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

Alternative 1B

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

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

Alternative 1A

Offshore Disposal Only

Under this alternative, material would be conveyed via pipeline and barge to LA-5. Short-term impacts would be identical to Alternative 2A for the pipeline and booster pumps conveying material from the dredge to an offshore barge. Offshore equipment (e.g., offshore mooring, monobuoy, and barge) would appear visible on the horizon much like many other boats (e.g., fishing, pleasure, etc.) that are active along the coast. The actual disposal of the material from the barge to the ocean floor would be so far offshore that the barge would not be visible to viewers on the beach or people on the bluffs. **The short-term nature of offshore disposal activities and the limited visibility of the pipeline to beachgoers would result in less than significant and not substantially adverse visual impacts (Criteria A, B, and C).**

No Project/No Federal Action Alternative

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

3.9.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

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

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

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

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

Materials Disposal/Reuse

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

3.9.5 LEVEL OF IMPACT AFTER MITIGATION

Lagoon Restoration

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

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

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

NEPA: Mitigation measure Visual-1 would partially reduce the temporary adverse visual effects that would result from construction activities throughout the lagoon. While visual impacts associated with project construction of Alternative 2A and Alternative 1B within the lagoon would cease over time with the end of construction and the restoration/recovery of lagoon habitats, the temporary visual effects are considered adverse due to the length of time that the visual condition of the lagoon would be degraded as well as the sensitivity of viewers.

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

Materials Disposal/Reuse

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

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

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3.10 TRAFFIC, ACCESS, AND CIRCULATION

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

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

3.10.1 AFFECTED ENVIRONMENT

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

San Elijo Lagoon Study Area

Study Area

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

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

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

Existing Circulation System

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

<u>Interstate 5</u>

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

<u>Coast Highway 101</u>

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

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

Chesterfield Drive

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

San Elijo Avenue

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

Manchester Avenue

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

Lomas Santa Fe Drive

Lomas Santa Fe Drive is classified as a Major Arterial road on the City of Solana Beach Circulation Element. It extends from Coast Highway 101 near the coast eastward to the Solana Beach city limits. It provides four undivided travel lanes with an intermittent two-way left-turn lane from Coast Highway 101 to where it forms a fully signalized diamond interchange at I-5. The speed limit is posted at 35 mph and Class II bike lanes are provided along both sides of the roadway within the study area.

North Rios Avenue

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

Existing Level of Service

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

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

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

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

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

Table 3.10-1
Existing Street Segment Traffic Volumes and LOS

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

Table 3.10-2
Existing Intersection Operations

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

[1] Average delay expressed in seconds per vehicle

Materials Disposal Study Area

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

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

Table 3.10-3
Principal Access Routes

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

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

3.10.2 CEQA Thresholds of Significance

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

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

B. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

C. Result in inadequate emergency access;

D. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities; or

E. Result in a long-term impact to access routes, local streets, or parking areas in the vicinity of the project area.

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

Table 3.10-4
Traffic Impact Significance Thresholds

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

[1] All LOS measurements are based on Highway Capacity Manual procedures for peak-hour conditions. However, V/C ratios for roadway segments may be estimated on an ADT/24-hour traffic volume basis (using this table or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.
[2] If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are deemed significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets.
[3] The City of Encinitas accepts LOS D operations, regardless of project increase in V/C, delay, etc., whereas the City of Solana Beach considers LOS D to have the same allowable increases as LOS E/LOS F. The analysis tables define the jurisdiction of each location.
V/C = volume to capacity ratio
Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters

3.10.3 Environmental Consequences

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

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

Lagoon Restoration

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

Trip Generation

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

Vegetation Clearing

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

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

Temporary Dike Construction and Removal

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

Dredging

Dredging of the lagoon would occur over all four phases of the project. The dredged material would be exported from the site via pipeline or reused within the project footprint, so no truck trips would occur and the total number of workers expected on any given day was assumed to account for dredging-related activities. Ocean-based traffic associated with materials placement and disposal, including barge trips and monobuoy location, is addressed under Land Use/Recreation and Hazardous Materials and Public Safety. These sections also discuss project design features identified in Chapter 2 that are intended to minimize conflicts with existing marine traffic, such as coordination with USCG and issuance of a Notice to Mariners (see PDF-59 through PDF-62).

Worker Trips

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

Miscellaneous Trips

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

Employee Parking

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

Bridge Reconstruction (Alternative 2A Only)

The project would demolish and replace Coast Highway 101 with a bridge over the new mouth of the lagoon (Alternative 2A only). Based on construction estimates, 240 two-way concrete delivery truck trips, 200 two-way other delivery-type truck trips, 600 two-way base and asphalt concrete delivery truck trips, and 3,000 two-way dump truck trips would be required over the course of the 18-month bridge construction period. It is expected that concrete delivery trucks would occur over 40 days throughout the entire bridge construction period, other delivery truck trips would occur regularly throughout the entire 18 months, base and asphalt concrete delivery truck trips would occur over 6 months (3 months per stage) during construction of the new roadway, and dump truck trips would occur over 2 months (1 month per stage) to excavate for the bridge and remove the existing roadway.

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

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

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

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

Bridge Retrofitting (Alternatives 1B and 1A Only)

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

Total Trip Generation

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

<u>Methodology</u>

Signalized Intersections

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

Unsignalized Intersections

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

Street Segments

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

Alternative 2A

Street Segments

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

Table 3.10-5
Street Segment Operations

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

Capacities based on City of Encinitas and Solana Beach roadway classification tables.
Δ=Change in delay due to construction traffic.
[1] Coast Highway 101 north of Lomas Santa Fe Drive is constructed with one lane in the southbound direction and two lanes in the northbound direction separated by a landscaped raised median. Therefore, a modified capacity of 30,000 ADT for a 4-Lane Major Arterial was used in the analysis.
[2] A nominal number of trips generated during the vegetation removal phase of the project would be expected to use Rios Avenue to reach a site access/staging area at the northern terminus of this residential roadway (6 ADT).

Intersections

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

Table 3.10-6
Intersection Operations

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

1 Average delay expressed in seconds per vehicle.
2 Δ=Change in delay due to construction traffic.
3 Although vegetation removal traffic was assigned to the Lomas Santa Fe/Rios Avenue intersection due to the location of a project access/staging area at the terminus of this residential street, 0 trips would be expected to occur during the AM/PM peak hours.

Bridge Construction

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

Traffic volume on Coast Highway 101 near the bridge includes both discretionary trips and necessary trips. "Discretionary" trips are those made on Coast Highway 101 out of convenience or pleasure. "Necessary" trips along Coast Highway 101 would consist of local residential or business trips between coastal cities that would use the road as the fastest route between destinations. With respect to bridge construction, it is assumed that necessary trips would remain on Coast Highway 101, despite the diminished capacity through the construction zone, while discretionary trips would either avoid Coast Highway 101 altogether, or would divert to I-5 before the construction zone. The final lateral roadways to divert to would be (from the south) Lomas Santa Fe Drive, or (from the north) Manchester Avenue via Chesterfield Drive.

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

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

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

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

Summer/Special Event Season

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

Table 3.10-7
Bridge Replacement Street Segment Operations

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

[1] Capacities based on City of Encinitas and City of Solana Beach roadway classification tables.
[2] Δ=Change in delay due to construction traffic.
Notes:
The two-lane capacity of Coast Highway 101 is half of the four-lane capacity (35,200 ADT ÷ 2 = 17,600 ADT)
The demand on Coast Highway 101 exceeds the reduced capacity by 2,710 ADT.
The excess demand (2,710 ADT) is expected to divert to Chesterfield Drive/Manchester Avenue and Lomas Santa Fe Drive.
The total diverted trips are divided by 2: northbound = 1,355 ADT to Lomas Santa Fe Drive; southbound = 1,355 ADT to Chesterfield Drive/Manchester Avenue

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

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

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

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

Other Traffic and Circulation Considerations

The bridge reconstruction would occur during Phases 1 through 3 of the overall project. Bridge reconstruction would occur in two parts, with each part resulting in the closure of one side of the highway, although two-way traffic would be maintained at all times. Bridge reconstruction is anticipated to take 18 months total, 10 months for the first phase, and 8 months for the second. The highway alignment and bridge approach would conform to Caltrans standards for sight distance and vertical clearance (PDF-41). No new vehicle types (e.g., farm equipment) are anticipated to use the bridge and no intersections would be added to the alignment. No horizontal curves would be added to the project with the exception of temporary detour lanes. Temporary detours would likely require a temporary speed limit reduction for the detour approaches and exits, but would still conform to safe highway design speeds (PDF-42). With incorporation of these project design features, implementation of Alternative 2A would not result in a substantial increase in hazards due to a design feature or incompatible uses. Bridge construction would result in a new and safely designed structure that would serve traffic in a manner similar to the existing roadway. The construction or operation of the project would not create new or incompatible transportation uses on the local circulation system. **These features would not substantially increase hazards or introduce incompatible uses along Coast Highway 101, and would not represent a significant impact (Criterion B). No substantial adverse impact would occur.**

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

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

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

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

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

Alternative 1B

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

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

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

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

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

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

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

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

Alternative 1A

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

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

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

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

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

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

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

No Project/No Federal Action Alternative

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

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

Materials Disposal/Reuse

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

Alternative 2A and Alternative 1B: Onshore Placement

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

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

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

3.10.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

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

Lagoon Restoration

Traffic-1 Prepare work zone traffic control plans for lane closures and related construction along Coast Highway 101. The work zone traffic control plans shall be prepared in accordance with the California Manual of Uniform Traffic Control Devices (CAMUTCD), Caltrans Standard Plans (2010), and current standards and best practices of the reviewing and approving agencies. These plans are intended to accommodate workers within the roadway, while facilitating continued circulation for road users (motorists, bicyclists, and pedestrians including persons with disabilities in accordance with the ADA) through the work zone.

Traffic-2 Provide advanced notification to motorists that delays and traffic congestion will occur during bridge construction and retrofitting activities to encourage avoidance of the construction area. This notification may be accomplished through various measures such as information and detour routes included on the project website; traffic details included in notifications sent to local residents; traffic and alternative route information published in local media; and physical traffic control measures, such as temporary signage located at various distances from the construction area.

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

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

Materials Disposal/Reuse

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

3.10.5 Level of Impact after Mitigation

Lagoon Restoration

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

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

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

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

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

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

Materials Disposal

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

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

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3.11 AIR QUALITY

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

3.11.1 AFFECTED ENVIRONMENT

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

Climate, Topography, and Meteorology

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

The climate of the SDAB is characterized by warm, dry summers and mild winters. One of the main determinants of its climatology is a semipermanent high-pressure area (the Pacific High) in the eastern Pacific Ocean. This high-pressure cell maintains clear skies for much of the year. When the Pacific High moves southward during the winter, this pattern changes, and low-pressure storms are brought into the region, causing widespread precipitation. During fall, the region often experiences dry, warm easterly winds, locally referred to as Santa Ana winds, which raise temperatures and lower humidity, often to less than 20 percent. Rainfall in the City of Oceanside, which is the nearest climate monitoring station near the City of Encinitas, averages approximately 10.54 inches annually (WRCC 2012). The heaviest precipitation occurs in November through April. The mean annual air temperature is 60.3 degrees Fahrenheit (°F), and the mean maximum and mean minimum temperatures are 67.6°F and 52.9°F, respectively (WRCC 2012).

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

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

Criteria Air Pollutants

The California Air Resources Board (ARB) and EPA focus on the following air pollutants as indicators of ambient air quality: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less (PM_{10}), fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less ($PM_{2.5}$), and lead. Because these are the most prevalent air pollutants known to be harmful to human health and EPA regulates them by developing criteria for allowable emission levels, they are commonly referred to as "criteria air pollutants."

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

Table 3.11-1
National and California Ambient Air Quality Standards

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

Notes: mg/m^3 = milligrams per cubic meter; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; ppb = parts per billion; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standards. Contact EPA for further clarification and current national policies.

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

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

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

[f] On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 μg/m3 to 12.0 μg/m3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 μg/m3, as was the annual secondary standard of 15 μg/m3. The existing 24-hour PM10 standards (primary and secondary) of 150 μg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

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

[h] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Note that the 1-hour national standard is in units of ppb. California standards are in units of ppm. To directly compare the 1-hour national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical of 0.075 ppm.

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

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

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

Source: ARB 2013

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

Ozone

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

Particulate Matter (PM)

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

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

Inhalable coarse particles (PM_{10}) consist of PM emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and PM formed in the atmosphere by reaction of gaseous precursors.

Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads. Control of PM_{10} is primarily achieved through the control of dust at construction and industrial sites, the cleaning of paved roads, and the wetting or paving of frequently used unpaved roads.

PM_{10} includes the subgroup of finer particles ($PM_{2.5}$), such as those found in smoke and haze, with an aerodynamic diameter of 2.5 microns or smaller. These finer particles pose an increased health risk because they can deposit deep in the lungs and contain substances that are particularly harmful to human health. Sources of fine particles include all types of combustion activities such as motor vehicles, power plants, wood burning, and certain industrial processes. $PM_{2.5}$ is the major cause of reduced visibility (haze) in California.

Carbon Monoxide (CO)

CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Overall, CO emissions are decreasing because of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973. CO concentrations are typically higher in the winter due to higher rates of combustion inefficiency in colder engines; therefore, California has required the use of oxygenated gasoline in the winter months to reduce CO emissions.

Relatively high concentrations of CO are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Vehicle traffic emissions can cause localized CO impacts, and severe vehicle congestion at major signalized intersections can generate elevated CO levels, called “hotspots,” that can be hazardous to human receptors adjacent to the intersections.

Nitrogen Dioxide (NO_2)

NO_2 is a gas that is a product of the combustion of fossil fuels generated from vehicles and stationary sources, such as power plants and boilers. NO_2 can cause lung damage. As noted above, NO_2 is a type of NO_X and is a principal contributor to ozone and smog production.

Sulfur Dioxide (SO_2)

SO_2 is a gas that is a product of the combustion of fossil fuels, with the primary source being power plants and heavy industry that utilize coal or oil as fuel. SO_2 is also a product of diesel engine emissions. The human health effects of SO_2 include lung disease and breathing problems for asthmatics. SO_2 in the atmosphere contributes to the formation of acid rain. In the SDAB, there is relatively little combustion of coal and oil; therefore, SO_2 is less of a concern than in other parts of the country.

Lead

Lead is a highly toxic metal that may cause a range of human health effects. Lead anti-knock additives in gasoline represent a major source of lead emissions to the atmosphere. However, lead emissions have significantly decreased due to the near elimination of leaded gasoline use. Lead-based paint, banned or limited by EPA in the 1980s, is a health hazard when it deteriorates by peeling, chipping, or cracking; or generates lead dust when scraped, sanded, or heated.

Odor

Odor is considered an air quality issue, either at the local level (e.g., odor from wastewater treatment) or at the regional level (e.g., smoke from wildfires). An air pollutant means fume, smoke, PM, vapor, gas, odorous substance, or any combination thereof. Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

SDAB Attainment Status

Specific geographic areas are classified as either "attainment" or "nonattainment" areas for each pollutant based on the comparison of measured data with federal and state standards. The SDAB currently meets NAAQS for all criteria air pollutants except ozone, and meets CAAQS for all criteria air pollutants except ozone, PM_{10}, and $PM_{2.5}$. The SDAB currently falls under a federal maintenance plan for CO, following a 1998 redesignation as a CO attainment area. The SDAB is currently classified as a state nonattainment area for ozone, PM_{10}, and $PM_{2.5}$.

SDAB Existing Air Quality

Ambient air pollutant concentrations in the SDAB are measured at air quality monitoring stations operated by ARB and SDAPCD. The closest and most representative SDAPCD air quality monitoring station to the project site is the Del Mar monitoring station, located at 215 9th Street in Del Mar, California. However, that monitoring station only collects data on concentrations of ozone. The closest monitoring station with complete data is the Escondido monitoring station, located at 600 East Valley Parkway in Escondido, California. Table 3.11-2 presents the most recent available data over the past 3 years from the Del Mar and Escondido monitoring stations as summaries of the exceedances of standards and the highest pollutant levels recorded for years 2010 through 2012.

Table 3.11-2
Ambient Air Quality Summary – Del Mar and Escondido Monitoring Stations

Pollutant Standards	2010	2011	2012
Carbon Monoxide (CO)			
National maximum 8-hour concentration (ppm)	2.46	2.20	3.61
State maximum 8-hour concentration (ppm)	2.46	2.30	3.70
State maximum 1-hour concentration (ppm)	3.9	3.5	4.4
Number of Days Standard Exceeded			
NAAQS 8-hour (>9.0 ppm)	0	0	0
CAAQS 8-hour (>9.0 ppm)	0	0	0
CAAQS 1-hour (>20.0 ppm)	0	0	0
Nitrogen Dioxide (NO_2)			
State maximum 1-hour concentration (ppm)	0.064	0.062	0.062
Annual Average (ppm)	0.014	*	0.013
Number of Days Standard Exceeded			
CAAQS 1-hour	0	0	0
Ozone			
State max 1-hour concentration (ppm)	0.085	0.091	0.088
National maximum 8-hour concentration (ppm)	0.072	0.075	0.079
Number of Days Standard Exceeded			
CAAQS 1-hour (>0.09 ppm)	0	0	0
CAAQS 8- hour (>0.070 ppm)/NAAQS 8-hour (>0.075 ppm)	2/0	1/0	2/2
Particulate Matter (PM_{10}) [a]			
National maximum 24-hour concentration (μg/m^3)	42.0	40.0	33.0
State maximum 24-hour concentration (μg/m^3)	43.0	40.0	33.0
State annual average concentration (μg/m^3)	21.0	18.8	18.1
Estimated Number of Days Standard Exceeded			
NAAQS 24-hour (>150 μg/m^3)	0	0	0
CAAQS 24-hour (>50 μg/m^3)	0	0	0
Particulate Matter ($PM_{2.5}$) [a]			
National maximum 24-hour concentration (μg/m^3)	48.4	69.8	70.7
State maximum 24-hour concentration (μg/m^3)	52.2	27.4	70.7
National annual average concentration (μg/m^3)	12.7	13.2	10.8
State annual average concentration (μg/m^3)	*	10.4	*
Estimated Number of Days Standard Exceeded			
NAAQS 24-hour (>35 μg/m^3)	2	3	1

μg/m^3 = micrograms per cubic meter; ppm == parts per million
Source: ARB 2014

As shown in Table 3.11-2, ambient air concentrations of CO, NO_2, and PM_{10} at the Del Mar and Escondido monitoring stations have not exceeded the NAAQS/CAAQS in the past 3 years. $PM_{2.5}$ concentrations exceeded the federal standards every year for the past 3 years, and concentrations of 8-hour ozone registered at the monitoring station have also exceeded the CAAQS every year in the past 3 years.

Sensitive Receptors

Some members of the population are especially sensitive to air pollutant emissions and should be given special consideration when evaluating air quality impacts from projects. These include children, the elderly, people with preexisting respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Air quality regulators typically define sensitive receptors as schools, hospitals, resident care facilities, day-care centers, or other facilities that may house individuals with health conditions that would be adversely impacted by changes in air quality.

Residential areas are also considered sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution even though exposure periods during exercise are generally short. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent as the majority of the workers tend to stay indoors most of the time.

3.11.2 THRESHOLDS FOR DETERMINING SIGNIFICANCE

A significant impact related to air quality would occur under CEQA if implementation of the project would:

A. Conflict with or obstruct implementation of the applicable air quality plan;

B. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

C. Expose sensitive receptors to substantial pollutant concentrations; or

D. Create objectionable odors affecting a substantial number of people.

These significance thresholds were derived from Appendix G of the State CEQA Guidelines. As stated in Appendix G, the significance criteria established by the applicable air quality management board or air pollution control district may be relied on to make the impact determinations for specific program elements. SDAPCD has not developed quantitative significance thresholds for CEQA projects. However, San Diego County has established recommended screening level thresholds of significance for regional pollutant emissions. Since SDAPCD does not have quantitative significance thresholds, the San Diego County screening thresholds of significance for regional pollutant emissions were used to analyze the impacts of the project. A project with emissions rates below these thresholds is considered to have a less than significant impact on regional and local air quality throughout the SDAB. The County of San Diego *Guidelines for Determining Significance and Report Format and Content Requirements, Air Quality* (2007), which outline these screening level thresholds, state that a project that results in an emissions increase less than these levels would not:

- cause a violation of a state or national ambient air quality standard anywhere that does not already exceed such standard,
- cause additional violations of a national ambient air quality standard anywhere the standard is already being exceeded,
- cause additional violations of a state ambient air quality standard anywhere the standard is already being exceeded, or
- prevent or interfere with the attainment or maintenance of any state or national ambient air quality standard.

Therefore, if the emissions of the proposed project are found to be below the screening level thresholds, it can be concluded that the project would not lead to a violation of a NAAQS or CAAQS. The screening level thresholds are shown in Table 3.11-3.

Table 3.11-3
Regional Pollutant Emission Screening Level Thresholds of Significance

	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$	Lead
Pounds per hour	–	25	100	25	–	–	–
Pounds per day	75	250	550	250	100	55	3.2
Tons per year	13.7	40	100	40	15	10	0.6

ROG = reactive organic gases; NOX = oxides of nitrogen; SO_X = sulfur oxides; CO = carbon monoxide; PM_{10} = respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less, $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less
– = No threshold proposed
Source: County of San Diego 2007

This analysis does not directly evaluate lead or oxides of sulfur (SO_X) because little to no quantifiable and foreseeable emissions of these substances would be generated by the project. Lead emissions have significantly decreased due to the near elimination of leaded fuel use. On- and off-road diesel fuel used in California must meet low sulfur standards established by ARB; thus, SO_X emissions due to diesel exhaust are assumed to be minimal. The cumulative analysis for air quality is included in Chapter 4 of this EIR/EIS, and analyzes whether the project would result in a considerable net increase of criteria pollutants for which the project region is designated nonattainment.

NEPA analysis for air quality impacts is provided separately from the CEQA analysis. The General Conformity Rule (40 CFR Sections 51.850–51.860 and 93.150–93.160) requires any federal agency responsible for an action in a federal nonattainment or attainment/maintenance area to demonstrate conformity to the applicable State Implementation Plan (SIP). To do so, the federal agency must determine that the action is either exempt from General Conformity Rule requirements or subject to a formal conformity determination. Conformance to the SIP is demonstrated by obtaining appropriate permits from SDAPCD, or by demonstrating that emissions would be less than *de minimis* thresholds.

General conformity *de minimis* thresholds are appropriate thresholds to be used for determining NEPA significance. A NEPA air quality significance analysis differs from the General Conformity analysis in that all project criteria pollutant emissions are considered: emissions for pollutants where the area has attained the NAAQS, as well as emissions for pollutants where the region is currently designated as a nonattainment or maintenance area. Therefore, in the SDAB, project attainment emissions of SO_X, PM_{10}, and $PM_{2.5}$, would be considered for impact significance under NEPA for air quality in addition to CO, ROG, and NO_X considered under General Conformity.

The total annual direct and indirect project emissions of attainment pollutants, as well as the emissions of nonattainment/maintenance pollutants (analyzed for General Conformity) from project construction and operation activities would be compared against the *de minimis* levels for the attainment status of these pollutants. The applicable *de minimis* thresholds for the project emissions generated in the SDAB are shown in Table 3.11-4.

The principal source of water-based emissions from construction activities would be from diesel engines used for tugboat engines, dredge propulsion, and driving dredge pumps. Tugboats and dredges are registered through the state or permitted at the air district level based on hours of annual operation, not on a project-specific basis. Tugboats and dredges can be registered under ARB's Portable Equipment Registration Program or would be subject to the ARB Commercial Harbor Craft Regulation.

Table 3.11-4
Applicable General Conformity/NEPA Significance Thresholds

Pollutant	*De minimis* Emission Threshold (tons/year)
CO	100
NO_X	100
ROG	100
SO_X	100
PM_{10}	100
$PM_{2.5}$	100

Source: 40 CFR Part 93

When applying for a permit, SDAPCD conducts an analysis based on the projected activity of the dredge on an annual basis. ARB and SDAPCD include an analysis of this equipment based on annual hours of operation. Because the air quality analysis for a dredge's annual permit accounts for the hours of equipment operation throughout the year, emissions would not be anticipated to occur above currently estimated levels as a result of the proposed project. However, to provide a conservative estimate of criteria pollutant emissions associated with the project alternatives, both land- and water-based emissions are included in the analysis.

Project impact significance under CEQA was determined by comparing the daily emissions for each project alternative to the San Diego County thresholds mentioned in Table 3.11-3. Project impact significance under NEPA was determined by comparing the annual emissions to the General Conformity *de minimis* thresholds in Table 3.11-4. Project alternatives with the potential to generate emissions exceeding the thresholds would have a significant impact (CEQA) or adverse effect (NEPA) on air quality. If the project alternative's emissions exceed the significance criteria, mitigation measures are available, depending on the nature of the air quality impact.

3.11.3 Environmental Consequences

Lagoon Restoration and Material Disposal

This analysis focuses on the criteria pollutant emissions resulting from construction and subsequent maintenance activities of the proposed project and alternatives. The analysis includes estimates of emissions associated with construction equipment, worker vehicle trips, dredge, and tugboat operation. Emissions from the operation of diesel-fueled off-road equipment were estimated by multiplying peak daily usage (i.e., hours per day) by equipment-specific emission factors and equipment-specific load factors consistent with ARB's off-road mobile source emission inventory model, OFFROAD. Criteria air pollutant emissions from on-road motor vehicles were estimated using EMFAC2011 mobile source emission factors. Worker and heavy-duty truck trips were estimated based on data provided in the *Traffic Impact Analysis for San Elijo Lagoon Restoration Project* (LLG 2014). Criteria pollutant emissions associated with dredge equipment and tugboat operations were estimated using emission factors from ARB's Harbor Craft Emissions Inventory Database. Other detailed assumptions are provided in Appendix K.

Fugitive PM dust emissions are primarily associated with site preparation and vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and miles traveled by construction vehicles on- and off-site. Fugitive dust emissions are associated with the use of construction equipment on unpaved surfaces, material dumping, and worker vehicle trips to the site. Since the majority of the construction activities for the project alternatives would occur within San Elijo Lagoon, the soil would be saturated, minimizing fugitive dust emissions. Based on the dredging and material disposal approach and schedule, it is not anticipated that the project would result in stockpiling of soil and related fugitive dust emissions. Therefore, the primary source of fugitive dust emissions for the project alternatives would be related to travel of heavy-duty vehicles on unpaved roads. Dust emissions were estimated using regional silt loading emission factors from EPA's Compilation of Air Pollutant Emission Factors (AP-42), including number of vehicles, vehicle weight, and vehicle miles traveled (VMT) per day.

This analysis evaluates the impacts of lagoon restoration and material disposal together. The finding of significance for the CEQA and NEPA thresholds cannot be determined separately and must be based on emissions for the entire project.

Alternative 2A

Temporary Impacts

Project consistency is based on whether the proposed project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Projects that are consistent with the assumptions used in development of the applicable air quality plan would not conflict with or obstruct the attainment of the air quality levels identified in the plan, even if the project-level emissions exceed the regional emissions thresholds.

The RAQS was developed pursuant to California Clean Air Act requirements and identifies feasible emissions control measures to provide expeditious progress in San Diego County toward attaining the state ozone standard. The RAQS control measures focus on emission sources under

SDAPCD authority, specifically stationary sources and some areawide sources. The RAQS identifies areawide sources as mostly residential sources, including water heaters, furnaces, architectural coatings, and consumer products. Assumptions for land use development used in the RAQS are taken from local and regional planning documents, including general plan land use designations and zoning.

Consistency with the RAQS is determined by analyzing a project with the assumptions in the RAQS. Emission forecasts rely on projections of VMT by the Metropolitan Planning Organizations, such as SANDAG, and population, employment, and land use projections made by local jurisdictions. The project is primarily a construction project that would involve dredging and off-road construction equipment operations. The project would not develop any land uses (e.g., residential or commercial) that would increase activities and/or emissions associated with on-road mobile sources. The use of construction equipment in the RAQS is estimated for the region on an annual basis, and construction-related emissions are estimated as an aggregate in the RAQS. The project would not increase the assumptions for off-road equipment use in the RAQS. On-road trip generation would also occur during construction of the proposed project. Since trip generation associated with construction would be temporary, the proposed project would not increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of the proposed project would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **This impact would be less than significant under CEQA (Criterion A).**

Construction of the proposed project would result in the temporary generation of ROG, CO, NO_X, PM_{10}, and $PM_{2.5}$ emissions. During construction, criteria air pollutant and precursor emissions would be temporarily and intermittently generated from a variety of sources. Construction would require a combination of both dry and wet methods. Dry construction would involve land-based equipment, such as backhoes, dump trucks, and front-end loaders, to construct various project elements in dry conditions. Wet construction would involve working over water so that material could be removed using hydraulic dredge equipment. Construction equipment and vehicle engines would be maintained in good condition and properly tuned per manufacturers' specifications, and idling time would be limited, as appropriate, to minimize emissions (PDF-10).

The type of dredge equipment selected for the proposed project includes either a diesel-powered or electric dredge, so both equipment types were considered for this analysis. Facilities for electrical power would be provided for use by an electrical dredge. In addition, booster pumps may be necessary to convey material to the disposal locations. Dredging and pump operations could occur 24 hours per day and 7 days per week. To account for maintenance, fueling, and other related activities, dredging and pump equipment is typically assumed to have intermittent periods of nonoperation. For the purposes of this project, dredge equipment is assumed to operate for approximately 20 hours per day. Off-road equipment was assumed to operate up to 10 hours per day and 6 days per week.

Heavy construction equipment would be brought to and taken from the site by way of the regional highway and local street network. Site preparation would also occur during the mobilization period. Generally, construction would occur in four sequential phases (Section 2.10), on a year-round basis.

As shown in Table 3.11-5, construction emissions for Alternative 2A would result in maximum daily emissions of approximately 100 pounds of ROG, 1,020 pounds of NO_X, 407 pounds of CO, 77 pounds of PM_{10}, and 35 pounds of $PM_{2.5}$. Additional modeling assumptions and details are provided in Appendix K.

Table 3.11-5
Alternative 2A – CEQA Estimated Daily Construction Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Phase 1					
Mobilization/Demobilization/Site Preparation	8	70	393	3	3
Construction Equipment/On-Road Vehicles	39	457	155	56	16
Dredging	48	448	199	16	15
Material Disposal	13	116	52	4	4
Phase 1 – Maximum Daily Emissions	**100**	**1,020**	**407**	**77**	**35**
Phase 2					
Construction Equipment/On-Road Vehicles	42	453	154	60	16
Dredging	48	448	199	16	15
Phase 2 – Maximum Daily Emissions	**90**	**900**	**353**	**76**	**31**
Phase 3					
Construction Equipment/On-Road Vehicles	36	386	134	57	14
Dredging	48	448	199	16	15
Phase 3 – Maximum Daily Emissions	**85**	**833**	**333**	**73**	**29**
Phase 4					
Mobilization/Demobilization	2	26	14	1	1
Construction Equipment/On-Road Vehicles	26	253	98	40	10
Dredging	48	448	199	16	15
Phase 4 – Maximum Daily Emissions	**77**	**727**	**311**	**58**	**25**
Maximum Daily Emissions	**100**	**1,020**	**407**	**77**	**35**
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-5, construction-related emissions of CO, PM_{10}, and $PM_{2.5}$ would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds. Therefore, **temporary construction emissions would have a significant impact to regional air quality under CEQA (Criterion B).**

The General Conformity Rule requires federal agencies to analyze proposed actions according to standardized procedures and to provide a public review and comment period. The conformity determination process is intended to demonstrate that the proposed federal action would not:

- cause or contribute to new violations of federal air quality standards,
- increase the frequency or severity of existing violations of federal air quality standards, and
- delay the timely attainment of federal air quality standards.

The process to evaluate General Conformity for a proposed federal action involves an applicability analysis, conformity determination, and review. According to EPA guidance, the federal agency must apply the applicability requirements found at 40 CFR Section 93.153(b) to the federal action to evaluate whether, on a pollutant-by-pollutant basis, a determination of General Conformity is required. The guidance states that the applicability analysis can be (but is not required to be) completed concurrently with analysis required under NEPA. If the regulating federal agency determines that the General Conformity regulations do not apply to the federal action, no further analysis or documentation is required.

Analysis required by the General Conformity Rule focuses on the net increase in emissions compared to ongoing historical conditions. Existing SIPs are presumed to have accounted for routine, ongoing federal agency activities. Conformity analyses are further limited to those direct and indirect emissions over which the federal agency has responsibility and control. General Conformity analyses are not required to analyze emissions sources that are beyond the responsibility and control of the federal agency. Conformity determinations are not required to address emissions that are not reasonably foreseeable or reasonably quantifiable.

The federal agency can also take measures to reduce emissions below *de minimis* levels; therefore, the General Conformity Rule would not apply to the proposed action. The changes must be state or federally enforceable to guarantee that emissions would be below *de minimis* levels. The proposed project assumes various air quality mitigation measures to meet CEQA requirements due to significant impacts that would occur based on the CEQA significance thresholds. Based on CEQA provisions that mitigation measures be required in, or incorporated into, the project (14 CCR Section 15091[a][1]), Mitigation Measures AQ-1 through AQ-5 are considered design features of the proposed project for the purpose of the NEPA and General Conformity applicability analysis. This is not considered "mitigation" under the General Conformity Rule, because the rule does not apply to projects that are below *de minimis* levels. Table 3.11-6 summarizes the projected annual emissions associated with construction of Alternative 2A.

Table 3.11-6
Alternative 2A – Construction-Related NEPA/General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
2016					
Mobilization/Demobilization/Site Preparation	0.15	1.46	0.79	0.07	0.06
Construction Equipment/On-Road Vehicles	1.46	10.61	6.11	3.09	0.62
Dredging	3.77	35.02	15.57	1.26	1.16
Material Disposal	0.22	1.09	0.90	0.07	0.07
Total Annual Emissions	**5.60**	**48.18**	**23.36**	**4.49**	**1.90**
2017					
Construction Equipment/On-Road Vehicles	2.68	19.47	11.13	5.85	1.15
Dredging	7.07	65.67	29.19	2.36	2.17
Material Disposal	0.32	1.62	1.34	0.11	0.10
Total Annual Emissions	**10.08**	**86.76**	**41.66**	**8.32**	**3.42**
2018					
Construction Equipment/On-Road Vehicles	2.27	16.67	9.22	6.14	1.04
Dredging	7.25	67.35	29.94	2.42	2.22
Total Annual Emissions	**9.52**	**84.02**	**39.17**	**8.56**	**3.27**
2019					
Mobilization/Demobilization	0.09	0.94	0.49	0.04	0.03
Construction Equipment/On-Road Vehicles	0.80	8.48	3.63	2.19	0.37
Dredging	3.62	46.89	14.93	1.20	1.11
Total Annual Emissions	**4.51**	**56.30**	**19.05**	**3.44**	**1.51**
Maximum Annual Emissions[1]	**10**	**87**	**42**	**8**	**3**
De minimis Thresholds[2]	100	100	100	100	100
Exceed *de minimis* Thresholds?	No	No	No	No	No

[1] Estimates include NO_X emission reductions associated with mitigation measures AQ-1 and AQ-2.
[2] *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants PM_{10}, and $PM_{2.5}$.
Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-6, the estimated emissions associated with Alternative 2A are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with

Alternative 2A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Construction of the proposed project would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. PM exhaust emissions from diesel-fueled engines (diesel PM) were identified as a toxic air contaminant (TAC) by ARB in 1998 (ARB 1998). Generation of diesel PM from construction projects typically occurs in a single area for a short period. The variable nature of construction activity also affects the amount of time that equipment is typically within a distance that would expose sensitive receptors to substantial concentrations. Concentrations of mobile-source diesel PM emissions are typically reduced by 70 percent at a distance of approximately 500 feet (ARB 2005).

Sensitive receptors are located at varying distances from the project site. To the north, surrounding land uses include primarily residential development. Land uses bordering the lagoon to the south primarily consist of single-family residential development. An unincorporated area of San Diego County lies to the east of San Elijo Lagoon and consists of spaced rural development, primarily large estate homes. Residences are located as close as 300 feet from the proposed dredging area in the central basin, and as close as 2,000 feet from the proposed dredging area in the east basin.

Project construction would result in the generation of diesel PM emissions from the use of off-road diesel construction equipment required for vegetation clearing, dredging, and material disposal. Other construction-related sources of diesel PM are material delivery trucks and may include construction worker vehicles. However, not all construction worker vehicles would be diesel-fueled, and most diesel PM emissions associated with material delivery trucks and construction worker vehicles would occur off-site.

The dose of TACs is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure a person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period to a fixed amount of emissions results in a higher exposure level and higher health risks for the maximally exposed individual. According to the Office of Environmental Health Hazard Assessment's health risk assessments program (OEHHA 2003), which is used to determine the exposure of sensitive receptors to TAC emissions, risk should be based on a 70-year exposure period; however, such assessments can be limited to the period/duration of activities associated with the project.

The period of construction for the proposed project is approximately 3 years. Thus, if the maximum duration of potentially harmful construction activities near a sensitive receptor is 3 years, then the exposure would be approximately 4 percent of the total exposure period used for typical health risk calculations (i.e., 70 years). However, the distance at which off-road equipment would operate, and dredging and other activities would occur, near sensitive receptors would vary considerably during that time. Construction equipment would operate at a distance reasonably considered to have an effect on sensitive receptors (i.e., within 500 feet) for less time than the total period of the construction schedule.

Because the use of off-road heavy-duty diesel equipment would be temporary during the 3-year construction period and equipment would operate at varying distances from receptors, sensitive receptors would not be exposed to substantial construction-related emissions of TACs. Therefore, **construction-related TAC impacts to sensitive receptors associated with the proposed project would be less than significant under CEQA (Criterion C).**

CO concentration is a direct function of motor vehicle activity, particularly during peak commute hours, and certain meteorological conditions. Under specific meteorological conditions, CO concentrations may reach unhealthy levels with respect to local sensitive land uses, such as residential areas, schools, preschools, playgrounds, and hospitals. As a result, air districts typically recommend analysis of CO emissions at a local rather than a regional level. Many air districts have established preliminary screening criteria to determine if mobile-source emissions of CO would result in, or substantially contribute to, emissions concentrations that exceed the 1-hour ambient air quality standard of 20 parts per million (ppm) or the 8-hour standard of 9.0 ppm, respectively.

SDAPCD has not established screening criteria for CO hotspots, but the County of San Diego indicates that projects that cause road intersections to operate at or below LOS E with intersection peak-hour traffic volumes exceeding 3,000 vehicles could create a CO hotspot and result in a cumulatively considerable net increase of CO (County of San Diego 2007). According to the traffic study prepared for the proposed project, even with the addition of project traffic during the construction period, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better (LLG 2014).

The road along Coast Highway 101 across the mouth of the lagoon would be demolished and replaced with the proposed bridge. As discussed in Section 3.10, all roadway segments affected by the bridge lane closure would continue to operate at acceptable LOS C or better with the following exceptions:

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

Traffic volumes also affect the ability of a roadway or intersection to result in a CO hotspot. The CO hotspot analysis in the County of San Diego CEQA Air Quality guidelines (page 22) is based on information provided by the Sacramento Metropolitan Air Quality Management District (SMAQMD). If the project does not meet the LOS screening criteria, SMAQMD recommends that projects use the second tier of the screening criteria based on the roadway's traffic volumes. According to SMAQMD, a project would not result in localized CO impacts if the project would not cause an affected intersection to experience more than 31,600 vehicles per hour. The maximum hourly volumes at any of the roadway segments mentioned above would not exceed SMAQMD's screening threshold of 31,600 vehicles per hour.

Therefore, it is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

The human response to odors is extremely subjective, and sensitivity to odors varies greatly among the public. The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. While offensive odors rarely cause physical harm, they can be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Potential sources that may emit odors during construction activities include exhaust from diesel construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by diesel exhaust odors associated with project construction. Odors from these sources would be localized and generally confined to the immediate area surrounding the proposed project site. The proposed project would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Vegetation clearing and dredging could also result in odors associated with a high level of organic debris. However, while an odor may be noted, it would be typical of odor currently associated with low tide conditions in the area.

Therefore, the proposed project would not create objectionable odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

Permanent

As discussed earlier, project consistency is based on whether the proposed project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Monitoring and maintenance activities would occur annually, or as needed, and would require minor on-road trips associated with workers or mobilization of equipment. The proposed project would not require substantial daily on-road vehicle trips for continued project operations because it is a restoration project that would not involve facilities requiring intensive maintenance. This would require equipment delivery and limited worker trips for the dredge (which requires few workers). Therefore, the proposed project would not substantially increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of the proposed project would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with SDAPCD's RAQS. **The impact would be less than significant under CEQA (Criterion A).**

Maintenance requirements would be determined during the long-term monitoring program and may include, but are not limited to, inlet maintenance, maintenance dredging, plant removal and/or replacement, weed abatement, trash removal, and bank protection repair. The most intensive maintenance activities would involve maintenance dredging and would occur approximately every 3 to 4 years with the removal of 300,000 cy of material per maintenance cycle. The estimates of operational emissions are based on similar assumptions to those for construction emissions, as the primary sources of emissions would be similar to those used in the construction phase, including dredges, off-road equipment, and on-road motor vehicle trips related to workers. Emission factors were based on the earliest future year (e.g., 2020) that maintenance dredging activities would occur. Table 3.11-7 shows the projected emissions associated with operational and maintenance activities.

Table 3.11-7
Alternative 2A – CEQA Estimated Daily Operational and Maintenance Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Construction Equipment/On-Road Vehicles	9.29	76.84	43.49	2.65	2.37
Dredging	38.32	301.20	213.93	10.43	9.60
Total Daily Operational Emissions	**47.61**	**378.04**	**257.42**	**13.09**	**11.97**
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	No	**Yes**	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-7, operational emissions of ROG, CO, PM_{10}, and $PM_{2.5}$ would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, NO_X emissions associated with maintenance activities would exceed the applicable mass emission threshold. Therefore, **operational emissions associated with Alternative 2A would have a significant impact to regional air quality under CEQA (Criterion B).**

The General Conformity Rule requires federal agencies to analyze proposed actions according to standardized procedures. Analysis required by the General Conformity Rule focuses on the net increase in emissions compared to ongoing historical conditions. Table 3.11-8 summarizes the projected annual emissions associated with operational and maintenance activities for Alternative 2A.

Table 3.11-8
Alternative 2A – Operational and Maintenance NEPA/General Conformity Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
2020					
Construction Equipment/On-Road Vehicles	0.64	5.38	3.02	0.18	0.16
Dredge	2.87	22.59	16.04	0.78	0.72
Total Annual Emissions	**3.51**	**27.97**	**19.07**	**0.97**	**0.88**
De minimis Thresholds[1]	100	100	100	100	100
Exceed *de minimis* Thresholds?	No	No	No	No	No

[1] *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_X, PM_{10}, and $PM_{2.5}$.
Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-6, the estimated operation and maintenance emissions associated with Alternative 2A are less than the General Conformity *de minimis* thresholds. Therefore, operational emissions associated with Alternative 2A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to construction activities, maintenance activities for the proposed project would result in diesel exhaust emissions from on-site heavy-duty equipment. Maintenance activities for Alternative 2A would occur every 3 years for a period of 6 months. Because off-road heavy-duty diesel equipment would be used for a relatively short time period every 3 years, and because equipment would operate at varying distances, maintenance-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **operation and**

maintenance-related TAC impacts to sensitive receptors associated with the proposed project would be less than significant under CEQA (Criterion C).

As mentioned earlier, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better with implementation of the project alternatives. Therefore, it is not anticipated that operation of the proposed project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Operational emissions associated with maintenance activities, such as dredging, would include odors from exhaust from diesel equipment similar to construction activities. Infrequent maintenance worker trips would not be anticipated to generate or expose persons to substantial odor emissions. Therefore, the proposed project would not create objectionable odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

Alternative 1B

Temporary

Similar to the proposed project, construction of Alternative 1B would primarily involve dredging and off-road equipment operations. Alternative 1B would not develop any land uses (e.g., residential or commercial) that would increase activities and/or emissions associated with on-road mobile sources. The use of construction equipment in the RAQS is estimated for the region on an annual basis, and construction-related emissions are estimated as an aggregate in the RAQS. Alternative 1B would not increase the assumptions for off-road equipment use in the RAQS. On-road trip generation would also occur during construction of Alternative 1B. Since this would only occur for the duration of the construction period, Alternative 1B would not substantially increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1B would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **This impact would be less than significant under CEQA (Criterion A).**

Construction of Alternative 1B would be essentially the same as that for Alternative 2A, with the exception of the components of the tidal inlet, a new Coast Highway 101 bridge, and roadway approaches. As shown in Table 3.11-9, construction emissions for Alternative 1B would result in maximum daily emissions of approximately 87 pounds of ROG, 861 pounds of NO_X, 355 pounds of CO, 71 pounds of PM_{10}, and 29 pounds of $PM_{2.5}$ for infrastructure and the initial export of 1.4 mcy of material. This conservative estimate of maximum daily emissions would not exceed South Coast Air Quality Management District (SCAQMD) construction thresholds of significance. Additional modeling assumptions and details are provided in Appendix K.

As shown in Table 3.11-9, construction-related emissions of CO, PM_{10}, and $PM_{2.5}$ would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds. Therefore, **temporary construction emissions would have a significant impact to regional air quality under CEQA (Criterion B).**

Table 3.11-9
Alternative 1B – CEQA Estimated Daily Construction Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Phase 1					
Mobilization/Demobilization/Site Preparation	8	70	39	3	3
Construction Equipment/On-Road Vehicles	26	297	103	50	11
Dredging	48	448	199	16	15
Material Disposal	13	116	52	4	4
Phase 1 – Maximum Daily Emissions	**87**	**861**	**355**	**71**	**29**
Phase 2					
Construction Equipment/On-Road Vehicles	30	305	108	54	11
Dredging	48	448	199	16	15
Phase 2 – Maximum Daily Emissions	**78**	**753**	**307**	**70**	**26**
Phase 3					
Construction Equipment/On-Road Vehicles	30	305	108	54	11
Dredging	48	448	199	16	15
Phase 3 – Maximum Daily Emissions	**78**	**753**	**307**	**70**	**26**
Phase 4					
Mobilization/Demobilization	2	26	14	1	1
Construction Equipment/On-Road Vehicles	26	251	95	40	10
Dredging	48	448	199	16	15
Phase 4 – Maximum Daily Emissions	**76**	**725**	**308**	**58**	**25**
Maximum Daily Emissions	**87**	**861**	**355**	**71**	**29**
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

Table 3.11-10 summarizes the projected annual emissions associated with construction of Alternative 1B.

Table 3.11-10
Alternative 1B – Construction-Related NEPA/General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
2016					
Mobilization/Demobilization/Site Preparation	0.15	1.46	0.79	0.07	0.06
Construction Equipment/On-Road Vehicles	1.36	9.84	5.73	3.05	0.58
Dredging	3.77	35.02	15.57	1.26	1.16
Material Disposal	0.22	1.09	0.90	0.07	0.07
Total Annual Emissions	**5.51**	**47.41**	**22.98**	**4.44**	**1.86**
2017					
Construction Equipment/On-Road Vehicles	2.48	17.78	10.31	5.76	1.07
Dredging	7.07	65.67	29.19	2.36	2.17
Material Disposal	0.32	1.62	1.34	0.11	0.10
Total Annual Emissions	**9.88**	**85.07**	**40.84**	**8.22**	**3.34**
2018					
Construction Equipment/On-Road Vehicles	2.20	14.88	8.65	6.06	0.99
Dredging	7.25	67.35	29.94	2.42	2.22
Total Annual Emissions	**9.45**	**82.23**	**38.60**	**8.48**	**3.22**
2019					
Mobilization/Demobilization/Site Preparation	0.09	0.94	0.49	0.04	0.03
Construction Equipment/On-Road Vehicles	1.04	9.55	4.10	2.26	0.43
Dredging	3.62	46.89	14.93	1.20	1.11
Total Annual Emissions	**4.74**	**57.38**	**19.52**	**3.50**	**1.58**
Maximum Annual Emissions[1]	**10**	**85**	**41**	**8**	**3**
De minimis Thresholds[2]	100	100	100	100	100
Exceed *de minimis* Thresholds?	No	No	No	No	No

[1] Estimates include NO_X emission reductions associated with mitigation measures AQ-1 and AQ-2.
[2] *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants PM_{10}, and $PM_{2.5}$.
Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-10, the estimated annual emissions associated with Alternative 1B are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1B would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse effects would occur under NEPA.**

Similar to Alternative 2A, construction activities for Alternative 1B would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, sensitive receptors would not be exposed to substantial construction-related emissions of TACs. Therefore, **construction-related TAC impacts to sensitive receptors associated with Alternative 1B would be less than significant under CEQA (Criterion C).**

Similar to Alternative 2A, even with the addition of project traffic during the construction period, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better (LLG 2014). Since Alternative 1B would not cause road intersections or roadway segments to operate at or below LOS E, it is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Construction of Alternative 1B would not include a new tidal inlet or a new Coast Highway 101 bridge with roadway approaches. As mentioned earlier, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better with implementation of the project alternatives. It is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Similar to Alternative 2A, potential sources that may emit odors during construction activities for Alternative 1B include exhaust from diesel construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by diesel exhaust odors associated with project construction. Odors from these sources would be localized and generally confined to the immediate area surrounding the project site. Alternative 1B would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Vegetation clearing and dredging could also result in odors associated with a high level of organic debris. However, while an odor may be noted, it would be typical of odor currently associated with low tide conditions in the area. Therefore, **Alternative 1B would not create objectionable odors affecting a substantial number of people and impacts would be less than significant under CEQA (Criterion D).**

<u>Permanent</u>

As discussed earlier, project consistency is based on whether Alternative 1B would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Monitoring and maintenance activities would occur annually, or as needed, and would require minor on-road trips associated with workers or mobilization of equipment due to limited locations and activities anticipated for maintenance, as described in Section 2.10. Alternative 1B would not require significant daily on-road vehicle trips for continued project operations. Haul trips would not utilize public roadways, and traffic generated from maintenance activities would be limited to worker trips. Therefore, Alternative 1B would not significantly increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1B would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with SDAPCD's RAQS. **The impact would be less than significant under CEQA (Criterion A).**

Maintenance requirements would be determined during the long-term monitoring program and may include, but are not limited to, remedial dredging, plant replacement, weed abatement, trash removal, and bank protection repair. The most intensive maintenance activities would involve inlet maintenance and would occur annually for approximately 4 weeks with the removal of 40,000 cy of material per year by mechanical equipment (not a dredge). The estimates of operational emissions are based on similar assumptions to those for construction emissions, as the primary sources of emissions would be similar to those used in the construction phase, including off-road equipment and on-road motor vehicle trips related to workers. Table 3.11-11 shows the projected emissions associated with operational and maintenance activities.

Table 3.11-11
Alternative 1B – CEQA Estimated Daily Operational and Maintenance Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Construction Equipment/On-Road Vehicles	4.66	30.25	19.34	1.17	1.04
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	No	No	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-11, operational emissions of ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$ would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. Therefore, **operational emissions would have a less than significant direct impact to regional air quality under CEQA (Criterion B).**

Table 3.11-12 summarizes the projected annual emissions associated with construction of Alternative 1B.

Table 3.11-12
Alternative 1B – Operational and Maintenance NEPA/ General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$
Annual Construction Equipment/On-Road Vehicle Emissions	0.07	0.45	0.29	0.02	0.02
De minimis Thresholds[1]	100	100	100	100	100
Exceed *de minimis* Thresholds?	No	No	No	No	No

[1] *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_X, PM_{10}, and $PM_{2.5}$.

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-12, the estimated annual emissions associated with Alternative 1B are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1B would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to construction activities, operation and maintenance activities for Alternative 1B would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, maintenance-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **operation and maintenance-related TAC impacts to sensitive receptors associated with Alternative 1B would be less than significant under CEQA (Criterion C).**

Operation and maintenance of Alternative 1B would not cause road intersections to operate at or below LOS E. Therefore, it is not anticipated that operation of Alternative 1B would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Operational emissions associated with maintenance activities would include odors from exhaust from diesel equipment similar to construction activities. Infrequent maintenance worker trips would not be anticipated to generate or expose persons to substantial odor emissions. Therefore, **Alternative 1B would not create objectionable odors affecting a substantial number of people and impacts would be less than significant under CEQA (Criterion D).**

Alternative 1A

<u>Temporary</u>

Similar to the proposed project, construction of Alternative 1A would primarily involve dredging and off-road equipment operations. Alternative 1A would not develop any land uses (e.g., residential or commercial) that would increase activities and/or emissions associated with on-road mobile sources. The use of construction equipment in the RAQS is estimated for the region on an annual basis, and construction-related emissions are estimated as an aggregate in the RAQS. Alternative 1A would not increase the assumptions for off-road equipment use in the RAQS. On-road trip generation would also occur during construction of Alternative 1A. Alternative 1A would result in a maximum trip generation of 120 light-duty vehicle and 89 heavy-duty truck trips per day during the construction period. Since this would only occur for the duration of the construction period, Alternative 1A would not significantly increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1A would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **This impact would be less than significant under CEQA (Criterion A).**

Construction of Alternative 1A would be different from the other alternatives, but less complicated since it does not involve widespread dredging within the lagoon or require temporary dike construction or phasing. Similar to Alternative 1B, Alternative 1A does not include the components of the tidal inlet, a new Coast Highway 101 bridge, or roadway approaches. As shown in Table 3.11-13, construction emissions for Alternative 1A would result in maximum daily emissions of approximately 112 pounds of ROG, 1,076 pounds of NO_X, 462 pounds of CO, 80 pounds of PM_{10}, and 37 pounds of $PM_{2.5}$ for the initial export of 160,000 cy of material by dredging equipment. Besides the difference in the volume and frequency of export for construction materials between Alternate 1A and 1B, the distance to the material disposal location at LA-5 would result in added emissions for Alternate 1A. Additional modeling assumptions and details are provided in Appendix K.

As shown in Table 3.11-13, construction-related emissions of CO, PM_{10}, and $PM_{2.5}$ would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. However, construction-generated ROG and NO_X emissions would exceed applicable mass emission thresholds. Therefore, **temporary construction emissions would have a significant impact to regional air quality under CEQA (Criterion B).**

Table 3.11-13
Alternative 1A – CEQA Estimated Daily Construction Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Phase 1	92	470	760	30	28
Mobilization/Demobilization/Site Preparation	8	70	39	3	3
Construction Equipment/On-Road Vehicles	23	280	97	51	10
Dredging	19	166	79	6	5
Material Disposal	69	630	286	23	21
Phase 1 – Maximum Daily Emissions	**112**	**1,076**	**462**	**80**	**37**
Phase 2	23	280	97	51	10
Mobilization/Demobilization	2	26	14	1	1
Construction Equipment/On-Road Vehicles	18	191	70	29	7
Dredging	19	166	79	6	5
Phase 2 – Maximum Daily Emissions	39	383	163	36	13
Maximum Daily Emissions	**112**	**1,076**	**462**	**80**	**37**
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

Table 3.11-14 summarizes the projected annual emissions associated with construction of Alternative 1A. As shown in Table 3.11-14, the estimated emissions associated with Alternative 1A are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to Alternative 2A, construction activities for Alternative 1A would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. However, construction would occur for an even shorter period of time and exposure of sensitive receptors to TAC emissions would be less than 1 percent of the total exposure period used for typical health risk calculations (i.e., 70 years). Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, construction-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **construction-related TAC impacts to sensitive receptors associated with Alternative 1A would be less than significant under CEQA (Criterion C).**

Table 3.11-14
Alternative 1A – Construction-Related NEPA/General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
2016/2017					
Mobilization/Demobilization/Site Preparation	0.15	1.46	0.79	0.07	0.06
Construction Equipment/On-Road Vehicles	1.36	10.33	5.58	2.77	0.58
Dredging	1.29	11.22	5.34	0.39	0.36
Material Disposal	0.55	2.77	2.28	0.19	0.17
Total Annual Emissions	**3.35**	**25.79**	**13.99**	**3.41**	**1.16**
2018					
Mobilization/Demobilization	0.09	0.94	0.49	0.04	0.03
Construction Equipment/On-Road Vehicles	0.53	3.89	2.24	1.03	0.22
Dredging	0.64	5.61	2.67	0.19	0.18
Material Disposal	0.28	1.39	1.14	0.09	0.09
Total Annual Emissions	**1.54**	**11.82**	**6.54**	**1.36**	**0.52**
Maximum Annual Emissions[1]	**3.3**	**26**	**14**	**3**	**1**
De minimis Thresholds[2]	100	100	100	100	100
Exceed *de minimis* Thresholds?	No	No	No	No	No

[1] Estimates include NO_X emission reductions associated with mitigation measures AQ-1 and AQ-2.
[2] *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants PM_{10}, and $PM_{2.5}$.
Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A and Alternative 1B, even with the addition of project traffic during the construction period, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better (LLG 2014). Since Alternative 1A would not cause road intersections to operate at or below LOS E, it is not anticipated that implementation of the project would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Similar to Alternative 2A, potential sources that may emit odors during construction activities for Alternative 1A include exhaust from diesel construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, nearby receptors would not be affected by diesel exhaust odors associated with project construction. Odors from these sources would be localized and generally confined to the immediate area surrounding the project site. Alternative 1A would utilize typical construction techniques, and the odors would be typical of most construction sites and temporary in nature. Vegetation clearing and dredging could also result in odors associated with a high level of organic debris. However, while an odor may be noted, it would be similar to existing low tide conditions and would not be atypical for the area. Therefore, Alternative 1A would not create objectionable odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

Permanent

As discussed earlier, project consistency is based on whether the project would conflict with or obstruct implementation of the RAQS and/or applicable portions of the SIP. Monitoring and maintenance activities would occur annually, or as needed, and would require minor on-road trips associated with workers or mobilization of equipment. Alternative 1A would not require significant daily on-road vehicle trips for continued project operations. Haul trips would not utilize public roadways, and traffic generated from maintenance activities would be limited to worker trips. Therefore, Alternative 1A would not significantly increase activities and/or emissions associated with on-road mobile sources that have been included in the RAQS. Accordingly, implementation of Alternative 1A would not exceed the assumptions used to develop the current RAQS and would not obstruct or conflict with the SDAPCD RAQS. **The direct and indirect impacts would be less than significant under CEQA (Criterion A).**

Maintenance requirements would be determined during the long-term monitoring program and may include, but are not limited to, remedial dredging, plant replacement, weed abatement, trash removal, and bank protection repair. The most intensive maintenance activities would occur annually for approximately 3 weeks and would involve inlet maintenance with the removal of 35,000 cy of material per year by land-based mechanical equipment (not a dredge). The estimates of operational emissions are based on similar assumptions to those for construction emissions, as the primary sources of emissions would be similar to those used in the construction phase, including off-road equipment and on-road motor vehicle trips related to workers. Table 3.11-15 shows the projected emissions associated with operational and maintenance activities.

Table 3.11-15
Alternative 1A – CEQA Estimated Daily Operational and Maintenance Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Construction Equipment/On-Road Vehicles	4.66	30.25	19.34	1.17	1.04
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	No	No	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-15, operational emissions of ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$ would not exceed the County's screening level thresholds and would not violate air quality standards or contribute substantially to an existing or projected air quality violation. **Therefore, operational**

emissions would have a less than significant impact to regional air quality under CEQA (Criterion B).

Table 3.11-16 summarizes the projected annual emissions associated with construction of Alternative 1A.

Table 3.11-16
Alternative 1A – Operations and Maintenance NEPA/ General Conformity Applicability Analysis

Emission Source	Criteria Pollutant Emissions (tons/year)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Annual Construction Equipment/On-Road Vehicle Emissions	0.06	0.39	0.25	0.02	0.01
De minimis Thresholds[1]	100	100	100	100	100
Exceed *de minimis* Thresholds?	No	No	No	No	No

[1] *De minimis* thresholds for General Conformity of SDAB nonattainment pollutants ROG and NO_X, and maintenance pollutant CO; and for NEPA significance determinations of SDAB nonattainment pollutants, and SDAB attainment pollutants SO_X, PM_{10}, and $PM_{2.5}$.
Source: Modeled by AECOM 2014; for more detail see Appendix K

As shown in Table 3.11-16, the estimated annual emissions associated with Alternative 1A are less than the General Conformity *de minimis* thresholds. Therefore, temporary emissions associated with Alternative 1A would conform to the SIP, and a formal conformity analysis would not be required. **No substantial adverse direct or indirect effects would occur under NEPA.**

Similar to construction activities, operation and maintenance activities for Alternative 1A would result in short-term diesel exhaust emissions from on-site heavy-duty equipment. Because the use of off-road heavy-duty diesel equipment would be temporary, and because equipment would operate at varying distances, maintenance-related emissions of TACs would not expose sensitive receptors to substantial emissions of TACs. Therefore, **operation and maintenance-related TAC impacts to sensitive receptors associated with Alternative 1A would be less than significant under CEQA (Criterion C).**

As mentioned earlier, signalized and unsignalized intersections in the project area would continue to operate at LOS D or better with implementation of the project alternatives. Therefore, it is not anticipated that operation of Alternative 1A would cause a CO hotspot. Specifically, the CO concentrations resulting from the project would not violate the CAAQS for either the 1-hour period (20 ppm) or the 8-hour period (9.0 ppm). Therefore, **this impact would be less than significant under CEQA (Criterion C).**

Operational emissions associated with maintenance activities would include odors from exhaust from diesel equipment similar to construction activities. Infrequent maintenance worker trips would not be anticipated to generate or expose persons to substantial odor emissions. Therefore, Alternative 1A would not create objectionable odors affecting a substantial number of people. **Impacts associated with odors would be less than significant under CEQA (Criterion D).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would result in continued periodic maintenance at the project site and would therefore result in continued periodic emissions. Currently, management of the lagoon involves mechanical excavation to maintain an open inlet condition, as funding allows. Under this alternative, no dredging or excavation would occur to improve tidal circulation, channel clearing, or other comprehensive actions to improve tidal exchange or upstream flooding. The lagoon inlet would remain in its existing location.

Since there is no increase in activities under the No Project/No Federal Action Alternative, emissions would also not increase. Therefore, **emissions associated with the No Project/No Federal Action Alternative would be less than significant under CEQA (Criteria A, B, C, and D).**

3.11.4 Avoidance, Minimization, and Mitigation Measures

Under NEPA, estimated emissions associated with each of the alternatives are less than the General Conformity *de minimis* thresholds. No substantial adverse direct or indirect effects have been identified, so the project design features and additional measures below are considered avoidance and/or minimization measures under NEPA.

Construction-related emissions would exceed the recommended levels of significance for ROG and NO_X for Alternative 2A, Alternative 1B, and Alternative 1A, and construction activities could lead to a violation of an applicable air quality standard under CEQA (Criterion B for temporary and permanent conditions). Implementation of mitigation measures would address potential violations of air quality standards as a result of construction-related activities associated with construction of Alternative 2A, Alternative 1B, and Alternative 1A. To ensure that fugitive dust emissions do not exceed the applicable thresholds of significance for PM_{10} and $PM_{2.5}$, the County of San Diego also recommends typical design considerations that may be incorporated into projects to avoid air quality impacts. Project design features include measures to reduce criteria pollutant emissions, including requirements to maintain equipment and vehicles, minimizing idling time, and using appropriately sized engines to support the required scope of work. To reduce construction-related criteria pollutant emissions, Alternative 2A, Alternative 1B, and Alternative 1A shall implement the following mitigation measures for the duration of the construction period:

AQ-1 Off-road construction diesel engines not registered under ARB's Statewide Portable Equipment Registration Program that have a rating of 50 horsepower (hp) or more, shall meet, at a minimum, the Tier 3 California Emissions Standards, unless such an engine is not available for a particular item of equipment. Tier 2 engines will be allowed on a case-by-case basis when the Contractor has documented that no Tier 3 equipment or emissions equivalent retrofit equipment is available for a particular equipment type that must be used to complete construction. Documentation shall consist of signed written statements from at least two construction equipment rental firms.

AQ-2 Harbor craft with a Category 1 or 2 marine engine, such as tugboats used for material disposal, shall meet, at a minimum, EPA Tier 2 marine engine emission standards.

AQ-3 Dredging equipment shall be electric, if determined by the contractor to be feasible, based on availability and cost.

AQ-4 Contractors shall use alternative fueled (e.g., compressed natural gas [CNG], liquefied natural gas [LNG], propane), or electric-powered construction equipment, if determined by the contractor to be feasible, based on availability and cost.

AQ-5 The following measures shall be implemented by the construction contractor to reduce fugitive dust emissions associated with off-road equipment and heavy-duty vehicles:

- Exposed surfaces (e.g., unpaved access roads) shall be watered, as necessary, to control fugitive dust.
- Sweepers and water trucks shall be used to control dust and debris at public street access points.
- Dirt storage piles shall be stabilized by chemical binders, tarps, fencing, or other suppression measures.
- Provide sufficient perimeter erosion control to prevent washout of silty material onto public roads.

- Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling.
- Enforce a 15-mph speed limit on unpaved surfaces.

CEQA Mitigation Measure AQ-1 requires engines in diesel-fueled construction equipment above 50 hp to meet Tier 3 emission standards. Emission standards for diesel off-road equipment are based on the engine model year. Implementation of these standards, referred to as Tier 1 emission standards, became effective in 1996. The more stringent Tier 2 and Tier 3 emission standards became effective between 2001 and 2008, with the effective date dependent on engine horsepower. The OFFROAD model used in the analysis contains ranges of tier engines and uses average fleet data to develop emission factors for a given calendar year. Because the earliest year for project construction would be 2016 and the requirements for production of Tier 2 engines have been in effect for over 10 years, it is reasonable to assume that most, if not all, offroad construction equipment would meet Tier 2 emission standards without the application of CEQA Mitigation Measure AQ-1. Based on the improvements in emissions standards required by ARB, the analysis assumes that using off-road construction equipment with Tier 3 engines would result in an additional 38 percent reduction in both ROG and NO_X emissions from the use of Tier 2 equipment (SCAQMD 2014a). Mitigation Measure AQ-1 would achieve an even greater reduction in emissions compared to the use of equipment with Tier 1 engine standards.

CEQA Mitigation Measure AQ-2 addresses marine vehicle engines and would require the use of tugboats that meet Tier 2 marine engine standards and would result in at least a 45 percent reduction in both ROG and NO_X emissions (SCAQMD 2014b). The use of electric dredging equipment, if feasible, would reduce ROG and NO_X emissions associated with dredging activities.

The estimated reductions in daily criteria pollutant emissions achieved by CEQA Mitigation Measures AQ-1 and AQ-2 were estimated by multiplying unmitigated peak daily emissions by the percentages discussed above. Table 3.11-17 shows the mitigated construction emissions for the project alternatives.

Table 3.11-17
Mitigated Daily Construction Emissions

Emission Source	Criteria Pollutant Emissions (pounds/day)				
	ROG	**NO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
Alternative 2A	**81**	**837**	**407**	**77**	**35**
Alternative 1B	**72**	**711**	**355**	**71**	**29**
Alternative 1A	**72**	**702**	**462**	**80**	**37**
Daily Thresholds	75	250	550	100	55
Exceed Thresholds?	Yes	Yes	No	No	No

Source: Modeled by AECOM 2014; for more detail see Appendix K

The mitigated emissions shown in Table 3.11-17 include reductions associated with CEQA Mitigation Measures AQ-1 and AQ-2. Emission reductions associated with CEQA Mitigation Measures AQ-3 and AQ-4 would be dependent on implementation and were not quantified for this analysis.

3.11.5 LEVEL OF IMPACT AFTER MITIGATION

Implementation of Mitigation Measures AQ-1 through AQ-5 would ensure construction activities associated with the project would reduce criteria pollutant emissions.

CEQA: As shown in Table 3.11-17, the mitigated ROG emissions for Alternative 2A would continue to exceed the applicable significance thresholds. Mitigation Measures AQ-1 and AQ-2 would reduce ROG emissions associated with Alternative 1B and Alternative 1A to a less than significant level. Even with implementation of Mitigation Measures AQ-1 and AQ-2 discussed above, construction-related NO_X emissions for the project alternatives would continue to exceed the threshold of significance.

As discussed above, the use of electric dredging equipment was not quantified for this analysis. Mitigation Measure AQ-3 could reduce ROG emissions for the project alternatives to a less than significant level. However, even with the use of electric dredging equipment as discussed in Mitigation Measure AQ-3, NO_X emissions for the project alternatives would continue to exceed the threshold of significance because vehicular traffic alone would exceed the threshold. Therefore, construction activities for Alternative 2A, Alternative 1B, and Alternative 1A could lead to a violation of an applicable air quality standard. This impact would remain significant and unavoidable.

As discussed earlier in this section, PM_{10} and $PM_{2.5}$ emissions for the project alternatives would not exceed the applicable thresholds of significance. Implementation of CEQA Mitigation Measure AQ-5 would ensure that PM_{10} and $PM_{2.5}$ emissions would be less than significant.

NEPA: The estimated annual emissions for the project alternatives would not exceed the *de minimis* thresholds. Therefore, no substantial adverse direct or indirect effects would occur.

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3.12 NOISE

This section explains noise and vibration terminology and concepts; describes existing noise levels in the SELRP areas; and identifies sensitive receptors in the surrounding communities. Project impacts are then identified and evaluated in light of applicable noise regulations, which are described in Appendix C. Noise impacts to sensitive species are addressed in Section 3.6 Biological Resources.

Supporting technical information for this lagoon restoration element is provided in Appendix L. The analysis of noise related to materials placement is largely from the 2012 RBSP EA/EIR (SANDAG 2011).

3.12.1 AFFECTED ENVIRONMENT

Noise Terminology

Sound is a vibratory disturbance created by a moving or vibrating source that is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment.

In its most basic form, a continuous sound can be described by its frequency or wavelength (pitch) and its amplitude (loudness). Frequency is expressed in cycles per second, or hertz. Frequencies are heard as the pitch or tone of sound. High-pitched sounds produce high frequencies; low-pitched sounds produce low frequencies. The amplitude of pressure waves generated by a sound source determines the loudness of that source, typically expressed as sound-pressure levels, described in units of decibels (dB).

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this, the A-scale, which approximates the frequency response of the average young ear when listening to most everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate with the A-scale sound levels of those sounds. Therefore, the “A-weighted” noise scale is used for measurements and standards involving the human perception of noise. Noise levels using A-weighted measurements are written dB(A) or dBA.

Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease. It is widely accepted that the trained ear, however, can barely perceive noise level changes of 3 dBA (Caltrans 2009).

Table 3.12-1 shows the relationship of various noise levels to commonly experienced noise events.

Table 3.12-1
Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage receptor at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**— 70 —**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**— 60 —**	
		Large business office
Quiet urban daytime	**— 50 —**	Dishwasher next room
Quiet urban nighttime	**— 40 —**	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 2009

Noise Descriptors

Several rating scales (or noise "metrics") exist to analyze adverse effects of noise on a community. These scales include the equivalent noise level (L_{eq}), the day/night average sound level (DNL or L_{dn}), and the community noise equivalent level (CNEL). Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, meaning the equivalent noise level for that period of time. The period of time averaging may be specified; $L_{eq(8)}$ would be a 8-hour average. When no period is specified, a 1-hour average is assumed. It is important to understand that noise of short duration, that is, time substantially less than the averaging period, is averaged into ambient noise during the averaging period. Thus, a loud noise lasting many seconds or a few minutes may have minimal effect on the measured sound level averaged over a 1-hour period. To evaluate community noise impacts, the descriptor (CNEL) was developed to account for human sensitivity to nighttime noise. CNEL represents the 24-hour average sound level, with a 5 dB penalty for noise occurring during the evening and a 10 dB penalty for noise occurring at night.

Vibration Descriptors

Typical outdoor sources of perceptible ground-borne vibration and noise are construction equipment and traffic on rough roads. Construction activity can also result in varying degrees of ground-borne vibration, depending on the type of equipment, methods employed, and site geology.

Ground vibrations from construction activities do not often reach levels that can damage structures, but they can be noticeable in buildings close to construction activities. Structural damage due to vibration is assessed in terms of peak particle velocity (PPV) and expressed in units of inches per second (in/sec).

The rumbling sound caused by the vibration of built features is ground-borne noise, and is generally related to root mean square velocity levels expressed in vibration decibels (VdB). In contrast to airborne noise, ground-borne noise is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 VdB or lower, which is well below the threshold of perception for humans of approximately 65 VdB.

Noise-Sensitive Receptors

Noise-sensitive receptors are generally considered humans engaged in activities, or utilizing land uses, that may be subject to stress of substantial interference from noise. Activities usually associated with sensitive receptors include, but are not limited to, studying, convalescence, and sleeping. Land uses often associated with sensitive receptors include residential dwellings, hotels and motels, hospitals, nursing residences, education facilities, and libraries.

The existing noise environment in this section highlights the noise-sensitive uses that would be exposed to noise sources with implementation of the proposed project. These receptors are located near the lagoon and adjacent to the materials placement sites (see Table 3.12-2). This section focuses on noise-sensitive receptors, as described above, and not all land uses. Specific adjacent land uses for each materials placement site are described in Section 3.1 Land Use/Recreation.

Table 3.12-2
Overview of Activities and Noise-Sensitive Receptors by Basin

Basin	Proposed Activity	Nearest Noise-Sensitive Receptors (1,000 feet or less)
Coastal	Construction of new inlet south of the existing feature; construction of cobble blocking features	Homes on West Circle Drive; overnight campers at San Elijo State Beach
West	Creation of new subtidal basin just landward of the new inlet; demolition of existing Coast Highway 101 roadway; construction of a new Coast Highway 101 bridge at new inlet location; deepening of channels under Coast Highway 101 bridges; construction of armor slopes at bridge base with rock	Homes on West Circle Drive, Solana Point Circle, and San Elijo Avenue
Central	Creation of new subtidal basin just landward of the new inlet	Homes on West Circle Drive, Solana Point Circle, North Rios Avenue, and San Elijo Avenue
	Clearing, grubbing, and haul-off of vegetation	Homes along Manchester Avenue
	Widening and redirecting main tidal channel just west of Interstate 5 extending into east basin	Homes along Manchester Avenue: Cape Sebastian Place, Camino Ocean Cove, Ocean Cove Drive, and MacKinnon Ranch Road
	Over-excavation of proposed overdredge pit	Homes along Solana Point Circle, North Rios Avenue, Gibson Point, Barbara Avenue, and North Granados Avenue
	Construction of access road at north end of North Rios Avenue	Homes along Solana Point Circle and North Rios Avenue
East	Widening and redirecting main tidal channel just west of Interstate 5 extending into east basin	Homes along Santa Inez and Santa Hidalga
	Widening of existing channel in east basin and removing existing weir	Homes along Santa Inez and Santa Hidalga

Vibration-Sensitive Receptors

Vibration-sensitive receptors are generally considered humans engaged in activities, or utilizing land uses, that may be subject to substantial interference from vibration. Activities and land uses often associated with vibration-sensitive receptors (i.e., structures and humans in proximity) are similar to those associated with noise-sensitive receptors (Table 3.12-2).

Existing Noise Environment

San Elijo Lagoon. The lagoon area is surrounded by a predominantly urban/suburban environment. The primary noise source within the area is transportation noise; other adjacent land uses that generate noise include:

- Vehicular traffic on Coast Highway 101 and I-5
- Railroad noise and aircraft over-flights
- San Elijo Joint Powers Authority Wastewater Plant

- Retail and restaurant land uses
- Commercial and residential landscape maintenance
- Schools (Solana Vista Elementary School, Encinitas Country Day School, and the Mira Costa College Campus)
- Churches (North Coast Presbyterian Church, and Saint Constantine and Helen Greek Orthodox Church)

Vehicles traveling on local roadways, landscaping equipment, and recreational activities generate noise levels that typically range from 55 to 90 dBA at 50 feet from the source. As part of the Draft General Plan Update, the City of Encinitas has prepared noise contours for I-5, Coast Highway 101, and the NCTD rail line within the lagoon study area (City of Encinitas 2010). As shown in Figure 3.12-1, noise levels range from 80 dBA CNEL in the vicinity of I-5 to 55 dBA CNEL in the eastern end of the lagoon. Noise levels between I-5 and Coast Highway 101 range from 80 to 60 dBA CNEL, with higher noise levels occurring closer to I-5 and Coast Highway 101 and the adjacent NCTD railroad. Noise levels at the beach in northern San Diego are typically close to 70 dBA due to wave activity (SANDAG 2011).

The NCTD rail line runs adjacent to Coast Highway 101 in the west part of San Elijo Lagoon and is utilized by Burlington Northern Santa Fe Railway (BNSF) freight trains, Amtrak passenger trains, and NCTD commuter trains ("The Coaster"). Existing noise levels in the vicinity of San Elijo Lagoon due to rail activities currently reach up to 76 dBA CNEL at homes nearest the rail line.

To further document the existing noise environment and to establish baseline ambient noise levels, noise measurements were taken. One long-term (24 hours) and six short-term (20 minutes) noise measurements were taken using an ANSI Level 1 Larson-Davis 820 sound level meter on November 20 and 21, 2012. A 20-minute sample is considered a "snapshot" of the baseline noise environment at a given time; the sound level may vary depending on time, day, or season. Noise measurement locations are shown in Figure 3.12-1, and corresponding ambient long- and short-term noise levels can be found in Table 3.12-3. Short-term noise measurements ranged from 47.0 to 65.4 dBA L_{eq}. Vehicle noise on I-5 and Coast Highway 101 dominated the noise environment. The long-term measurement resulted in a CNEL of 61 dBA. Noise monitoring field data sheets output sheets are included in Appendix L.

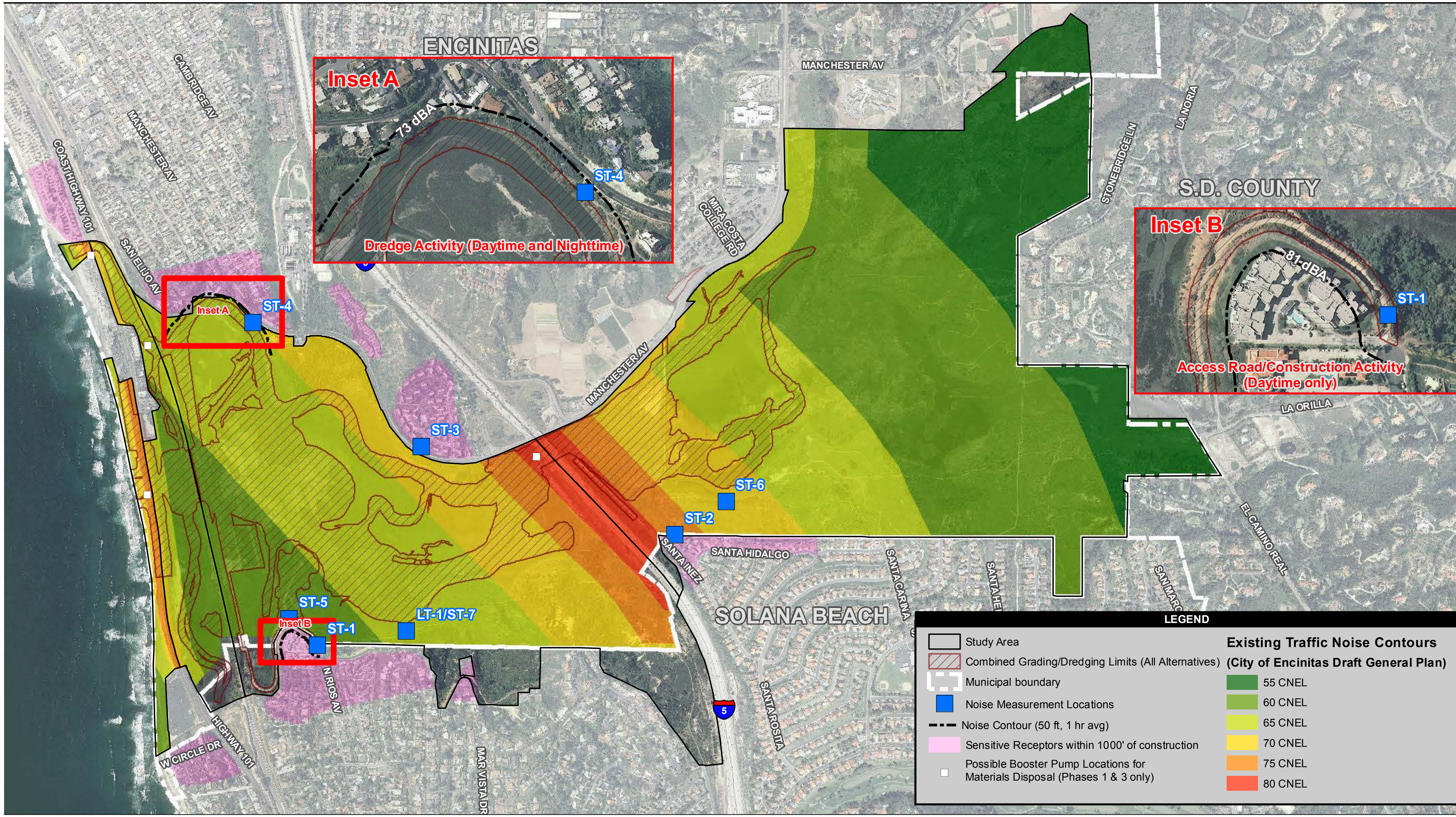
Table 3.12-3
Ambient Noise Measurements – San Elijo Lagoon

Noise Measurement #	L_{eq}	L_{max}
ST 1	50.6	65.7
ST 2	63.8	80.1
ST 3	48.6	60.7
ST 4	65.4	86.7
ST 5	53.2	58.2
ST 6	47.0	63.6
LT 1	61 dBA CNEL	n/a

ST = Short term
LT = Long term

Material Placement/Reuse Sites. Ambient noise measurements previously taken in support of the 2012 RBSP (SANDAG 2011) are representative for each of the proposed onshore materials placement sites. The principal source of noise at onshore materials placement sites is surf activity of the ocean, primarily breaking waves and the interaction of water, rocks, and sand in the surf area. Noise levels vary with the tide, wave height, and sand-rock composition, but in general onshore materials placement sites have relatively high background noise levels due to constant surf activity. This is typical of a beach environment. The proposed beach placement sites are also open to the public and have frequent recreational users and special events that generate noise, particularly during the warmer months. At night, noise generated by people using the beach decreases, but the primary source of noise from wave activity continues at the same levels as during the daytime. The measured noise levels, and additional noise sources associated with the individual materials placement sites, are described in Table 3.12-4. Figures 2-11A through 2-11E illustrate beach placement sites relative to adjacent coastal land uses.

There are no noise measurements at the offshore sites (LA-5 and SO-5/SO-6) because these sites are located a minimum of 0.5 mile from the coast and do not have sensitive receptors in proximity. Noise sources in the vicinity of offshore materials placement sites are primarily weather- and ocean-related but can also include aircraft over-flights, and military, commercial and pleasure-related boating activities.



Source: Landiscor 2010; Patton 2009-2011; AECOM 2012; City of Encinitas 2010

1,100 550 0 1,100 Feet

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

Figure 3.12-1
San Elijo Lagoon
Noise Conditions

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Table 3.12-4
Existing Noise Environment at Sand Placement Sites

Sand Placement Site	Noise Sources	Ambient Noise Level (L_{eq})	Nearby Sensitive Noise Receptors
Moonlight Beach	Ocean wave noise, residential and commercial landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Beach – 70 dBA. Nighttime noise at residences close to the beach – 67 to 68 dBA.	Single- and multi-family residences adjacent to the north end of the beach. The southernmost house is beach level, with a porch adjacent to the materials placement site.
Leucadia	Ocean wave noise, residential landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Residences above the beach – 63 to 66 dBA (nighttime). Materials placement site location 25 feet west of the bluff – 69 dBA.	Residences along Neptune Avenue on the bluffs approximately 60 to 80 feet above the beach.
Cardiff	Ocean wave noise, residential and commercial landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Top of the bluff – 68 dBA. Nearby rest area – 64 dBA.	Residences east of Coast Highway 101 and the railroad at least 900 feet north and south of the sand placement site. Overnight campers at San Elijo State Beach, approximately 1,500 feet from the placement site.
Solana Beach	Ocean wave noise, residential landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	Residences on the bluffs above the beach – 63 to 66 dBA. Materials placement site 35 feet west of the bluff on the beach – 69 dBA.	Residences along Helix Avenue and South Sierra Avenue, on the bluffs – approximately 65 feet above the beach.
Torrey Pines	Ocean wave noise, residential landscape equipment, vehicular traffic on the local arterial system, highways, and freeways; rail noise and aircraft over-flights.	At 20 feet west of a rock berm at beach level – 69 dBA.	Residences and businesses approximately 2,000 feet from the sand receptor site (near Carmel Valley Road).

Source: SANDAG 2011

Noise Regulations

Federal and state noise regulations have been established to protect public health and safety and prevent disruption of various human activities. The EPA Office of Noise Abatement and Control was established to coordinate federal noise control activities after its inception, issued the federal Noise Control Act of 1972, which established programs and guidelines to identify and address the effects of noise on public health and welfare and the environment. However, EPA transferred responsibilities for regulating noise control policies from the federal government to state and local governments.

Local jurisdictions have established criteria to regulate noise through the development of general plan noise elements and noise ordinances, which are generally intended to promote and/or protect the public health and comfort of residents. Therefore, activities conducted in compliance with local noise ordinances would not result in significant impacts. Noise ordinances can restrict both overall noise levels generated, as well as hours of specific activities, regardless of noise generated. If an activity operates outside of the limits set by ordinances, a noise variance can be granted by the jurisdiction, particularly if the project is in the interest of the public and provides a public benefit. If a variance is not granted, activities can only proceed in compliance with the ordinance. Applicable regulations are detailed in Appendix C of this EIR/EIS, but within the cities of Solana Beach and Encinitas and San Diego County, construction work is prohibited between the hours of 7:00 p.m. and 7:00 a.m. on weekdays and Saturdays, and on Sundays and holidays, unless a variance is granted. In addition, there is an 8-hour average construction noise level limit for San Diego County and the City of Solana Beach of 75 dBA $L_{eq(8)}$ between 7:00 a.m. and 7:00 p.m. measured at the property line, and a construction noise level limit for Encinitas of 75 dB not to be exceeded for more than 8 hours between 7:00 a.m. and 7:00 p.m. per 24-hour period measured at the property line. Many of the materials placement sites are located within California State Parks (Leucadia, Moonlight, Cardiff, and Torrey Pines), which do not regulate construction noise hours or levels. While regulations within some of the sites would not affect placement, noise levels at nearby sensitive receptors within adjacent jurisdictions are also identified as part of the analysis below.

Vibration Regulations

There are no specific regulations for vibration from the County of San Diego or cities of Solana Beach or Encinitas. The Federal Transit Administration (FTA) provides guidance for analysis of groundborne noise and vibration related to transportation and construction-induced vibration. The proposed project is not subject to FTA; however, these FTA guidelines serve as a useful tool to evaluate vibration impacts. With respect to human response within residential uses (e.g., annoyance, sleep disruption), FTA recommends a maximum acceptable vibration standard of 80 VdB (FTA 2006).

Caltrans also provides guidance for analysis of groundborne noise and vibration. The proposed project is not subject to Caltrans regulations; however, these guidelines serve as another useful tool to evaluate vibration impacts. Caltrans guidelines recommend that a standard of 0.2 in/sec PPV not be exceeded for the protection of normal residential buildings, and that 0.08 in/sec PPV not be exceeded for the protection of old or historically significant structures (Caltrans 2004).

3.12.2 CEQA Thresholds of Significance

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

A. Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies,

B. Expose persons to or generate excessive groundborne vibration or groundborne noise levels,

C. Result in a substantial permanent increase in ambient noise levels in the SELRP vicinity above levels existing without the SELRP, and

D. Result in a substantial temporary or periodic increase in ambient noise levels in the SELRP vicinity above levels existing without the SELRP.

The thresholds above are from CEQA Appendix G and mirror the thresholds suggested by the County.

3.12.3 Environmental Consequences

The project is habitat restoration, so there are no permanent structures being built that would generate noise. Noise generation would be from the multi-year construction period. Periodic maintenance would be the only "permanent" potential for noise increase, and that would vary by alternative. The lagoon noise analysis is generally structured around the type of noise-generating construction activity, instead of by significance threshold. Thus, the various types of construction activities (on-road noise, off-road noise, and dredging) are considered relative to the standards of the three local jurisdictions for daytime and nighttime operations (Criterion A); changes to ambient noise levels with and without the project (Criterion D) are also considered. The issues of vibration and permanent noise are addressed holistically instead of by construction activity type (Criteria B and C). The materials disposal analysis reflects a different type of construction activity; this project element would not be permanent.

Lagoon Restoration

Alternative 2A

<u>On-Road Vehicle Noise during Construction (Daytime Activities)</u>

Local roadways that would handle the bulk of project construction traffic include I-5, Coast Highway 101, Manchester Avenue, and Lomas Santa Fe. Project trip distribution is provided in the traffic study prepared for the project (Appendix J) and discussed in Section 3.10 Traffic, Access, and Circulation. Existing and existing plus project traffic noise levels were modeled using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (RD-77-108). Output data sheets are provided in Appendix L. As shown in Table 3.12-5, project construction traffic would not result in detectable increases in ambient noise levels at nearby sensitive receptors along affected roadways.

Table 3.12-5
On-Road Construction Traffic and Affected Noise-Sensitive Receptors

Affected Road Segment	Affected Sensitive Receptors	Noise Levels with and without Project Traffic CNEL/CNEL[1]	Noise Levels with and without Project Traffic L_{eq}/L_{eq}[1]
Coast Highway 101	<u>Coastal</u>. Homes on West Circle Drive, Overnight campers at San Elijo State Beach <u>West Basin</u>. Single-family residences along San Elijo Avenue, West Circle Drive, Acadia Avenue, Solana Point Circle and Seabright Lane	70/70	60/60
Manchester Avenue	<u>Central Basin.</u> Homes along Manchester Avenue, west of I-5 <u>East Basin.</u> NA	63/63	52/52
Lomas Santa Fe	Homes along Lomas Santa Fe	68/68	57/57
Chesterfield Drive	Homes along Chesterfield Drive	63/63	52/52

[1] Noise levels are modeled at 50 feet from centerline of respective roadways. Project traffic study is included as Appendix J. FHWA Output Data is included in Appendix L.

Another analysis was conducted utilizing the FHWA Highway Traffic Noise Prediction Model to evaluate the noisiest traffic hour that is expected to occur during project construction. This hour is expected to occur during the demolition of existing Coast Highway 101 and construction of a bridge to span the new lagoon inlet. Construction of the bridge would involve both demolition and construction, both of which would be variable in terms of worker and truck traffic generation. Worst-case construction traffic volumes associated with these activities would include 20 employee vehicles and 15 trucks arriving to the site. Traffic noise levels are expected to reach 47 dBA L_{eq} and 48 dBA CNEL. The model output sheets for this analysis are provided in Appendix L. Even if applied to the quietest measured location in the lagoon area (47 L_{eq} at ST-6 east of I-5), worst-case project construction traffic noise would not result in substantial temporary increase in ambient noise levels. Traffic noise needs to double to achieve a 3 dBA increase, an increase that is barely audible to a trained ear (Caltrans 2009). **Impacts would not be substantially adverse and would be less than significant (Criterion D).**

The subject traffic on nearby roads would occur during the routine construction time period of 7 a.m. to 7 p.m. (or daylight hours). Nighttime work would be associated with dredging inside the lagoon; this is addressed separately below. Thus, the on-road element of construction would be consistent with applicable standards. **Impacts would not be substantially adverse and would be less than significant (Criterion A).**

Off-Road Vehicles and Construction Equipment (Daytime Activities, Excluded Dredging)

Noise levels associated with typical off-road vehicles and construction equipment that may be used on the project site are presented in Table 3.12-6 (dredging equipment is discussed separately below). Also, construction equipment has mandatory backup alarms. Therefore, the equipment noise presented in Table 3.12-6 would be accompanied at times by backup alarm noise. Dredges are not typical construction equipment and have not been included in FTA noise level research. Potential dredge noise has been addressed separately below to allow for its incorporation into the noise analysis for the SELRP.

Table 3.12-6
Noise Levels of Typical Construction Equipment

Equipment	Maximum Noise Level (dBA) 50 Feet from Source
All other equipment (5 HP or less)	85
Backhoe	80
Compactor (ground)	80
Compressor (air)	80
Dozer	85
Dump Truck	84
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator (25 KVA or less)	70
Generator (more than 25 KVA)	82
Grader	85
Drill Rig Truck	84
Pumps	77
Soil Mix Drill Rig	80
Tractor	84

HP = horsepower; KVA = kilovolt ampere
Source: FTA 2006

A worst-case equipment usage scenario was developed to assess potential noise impacts associated with off-road equipment. The equipment scenario includes two dump trucks, a bulldozer, and a large backhoe operating concurrently and in proximity to each other. Over a period of 1 hour, the equipment would operate at an assumed load factor of 40 percent (to account for worker breaks, change in construction activities, and maintenance), resulting in an average noise level of approximately 81 dBA L_{eq} at 50 feet, which would decrease conservatively (for a hard acoustic surface) by approximately 6 dBA with each doubling of distance. For example, the above worst-case scenario of approximately 81 dBA L_{eq} at 50 feet would attenuate to 75 dBA L_{eq} at 100 feet, and 69 dBA Leq at 200 feet. Therefore, construction noise is of greatest concern when construction activity is closest to adjacent residential property lines.

The allowable construction noise level limit at residential property lines for the cities of Solana Beach and Encinitas and the County of San Diego is not to exceed an 8-hour average noise level of 75 dBA $L_{eq(8)}$ at a residential property line during the allowable construction hours of 7 a.m. to 7 p.m. The proposed project's worst-case 1-hour average construction noise level of 81 dBA $L_{eq(1)}$ at 50 feet from a residential property line must be evaluated when averaged over an 8-hour period.

Figure 3.12-1 identifies areas of sensitive receptors within 1,000 feet of construction activity (including dredging) associated with lagoon restoration (see pink shading). As shown, sensitive receptors 1,000 feet or less from the activity are primarily west of I-5, with a single row of homes in that radius east of I-5 in Solana Beach.

Figure 3.12-1 also illustrates the location of the 81 dBA L_{eq} noise contour (1-hour average) in relation to sensitive receptors located adjacent to, or within, that key contour. The two inserts in the figure reflect varying conditions. Insert A reflects the only place where nighttime dredging would be within 1,000 feet of residences (dredging impact evaluation is below). Insert B illustrates the residences that are closest to non-dredging construction activities (daytime only) and denotes the 81 dBA L_{eq} relative to the units.

Sensitive receptors in Insert B are primarily on the small hill overlooking the lagoon. Construction activity at the dirt road highlighted in Insert B (off North Rios Avenue) would be periodic (deliveries, crew changes, etc.) and limited to daytime hours in compliance with local noise ordinances. Peak noise levels would exceed 75 dBA at some times, depending on equipment use. Given periodic use, standard construction worker breaks, and on-site construction equipment/vehicle repositioning and maintenance, however, the transitory vehicular construction sound level limit averaged over an 8-hour period would be less than 75 dBA $L_{eq(8)}$ at any particular property line. Therefore, noise levels would not exceed the 75 dBA $L_{eq(8)}$ construction noise level limit established by the cities or County. To further minimize noise levels at adjacent residences, construction equipment, fixed or mobile, would be equipped with properly operating and maintained mufflers (PDF-8).

Removal of vegetation materials cleared from the lagoon would primarily occur through Site 7 (Figure 2-15), which would be sited adjacent to the I-5 on-/off-ramps to limit encroachment into adjacent neighborhoods. The site is located within the existing 75 dBA CNEL contour as identified by Encinitas, and is affected by traffic along the key regional highway I-5. Equipment at this site would be at least 300 feet from the nearest residential property line. Truck trips in and out could start early and end late to maximize operational hours of the landfill, but would remain within the 7 a.m. to 7 p.m. window. Vegetation removal is anticipated to occur over a 6-month period. In an 8-hour average, noise levels would not exceed the 75 dBA $L_{eq(8)}$. **Impacts at the worst-case residential location (Insert B) or vegetation removal staging area (Site 7) would not be substantially adverse and would be less than significant (Criterion A).**

<u>Dredging within San Elijo Lagoon (Daytime and Nighttime Activities)</u>

Areas proposed for dredging are shown in Figure 3.12-1. Dredging may be achieved with diesel and/or electric hydraulic dredges. Dredges can be very different from each other, with some engines totally enclosed, and others exposed on the deck, which are louder. Exposed engines can be housed to reduce noise. For the purposes of this analysis, both electric and diesel dredges are evaluated.

The exact horsepower, location, and configuration of the diesel engines and electric motors that would be part of the dredging system have not yet been determined. Noise produced from a hydraulic dredging operation within the Newport Bay area was measured to provide a reasonable noise estimate; specifically, an average noise level of 73 dBA L_{eq} at 50 feet (USFWS and SDRPJPA 2000). This noise level is consistent with a diesel dredge measured near Ross Island with the engine room door open (Ross Island 1999). The precise electric dredge that could be used for the SELRP would be dependent on the contractor selected for the project and availability of equipment and is also not known at this time. It is likely that noise levels would be comparable to or less than the electric dredge that is used to dredge the navigation channels in the Port of Los Angeles, which generates 71.5 dBA L_{eq} at 50 feet (USFWS and SDRPJPA 2000). Use of a diesel dredge represents the worst-case scenario. For purposes of this analysis, a noise reference level of 73 dBA L_{eq} at 50 feet for a diesel dredge is reasonable, and dredge noise levels would increase to 75 dBA L_{eq} at a closer distance of 40 feet from the dredge. Exposed engines on dredging equipment would be housed when possible to further reduce noise levels at residences adjacent to active dredging (PDF-9), but that reduction is not factored into this analysis in order to provide a conservative noise condition.

Because the dredge equipment would be much farther than 40 feet from sensitive receptors for the vast majority of construction, the 8-hour average construction noise level limit of 75 dBA $L_{eq(8)}$ for the City of Encinitas, City of Solana Beach, and County of San Diego would not be violated during daytime dredging activities. The one area where the dredge would be within 40 feet of residential property lines is illustrated in Insert A. Here, during the day, the dredge would be mobile over an estimated 6 months, generally near Coast Highway 101 and the along the channel along both sides of the NCTD railroad. Because of its mobile nature and the distance between the dredge and property lines, noise levels would not exceed the 75 dBA $L_{eq(8)}$ during the permitted daytime operating hours at any one property line. **Impacts would not be substantially adverse and would be less than significant (Criterion A).**

Dredging activities are possible within the lagoon 7 days a week, 24 hours a day. As noted above, noise thresholds limiting sound levels to 75 dBA $L_{eq(8)}$ during a 24-hour period would not be exceeded. However, due to proposed dredging outside of permitted daytime hours, variances would be required from the cities of Encinitas and Solana Beach and the County in order to operate dredging equipment on Sundays, holidays, and Mondays through Saturdays between 7 p.m. and 7 a.m. With issuance of a variance, 24-hour operations could occur, and **impacts would not be substantially adverse under NEPA. Even with an approved variance, impacts would be considered significant under CEQA (Criterion A).** If no variance is issued to allow nighttime work, dredging would be restricted to daytime hours in compliance with local noise regulations. This restriction would limit the feasibility of the current project construction approach, and additional CEQA analysis would be required.

<u>Vibration and Long-Term Maintenance (Daytime Activities)</u>

Vibration-inducing construction equipment could include vibratory rollers, hoe rams, dozers, jackhammers, and haul trucks. With the exception of the dozers/trucks, these are generally not associated with restoration dredging and habitat restoration, but could be used as part of Coast Highway 101 modifications and CBF installation at the new inlet. Although construction activities could generate perceptible vibrations to people in the immediate vicinity of the inlet/bridge construction sites, vibration levels dissipate rapidly over short distances (i.e., 50 feet). Ground-borne noise and ground-borne vibration levels associated with typical construction equipment are presented in Table 3.12-7. Actual vibration levels are dependent on construction procedures, soil and geologic conditions, and the structural characteristics of the buildings.

Table 3.12-7
Groundborne Vibration and Noise Levels for Typical Construction Equipment

Equipment	Peak Particle Velocity in Inches per Second			Approximate Lv in VdB[1]				
	Groundborne Vibration PPV (in/sec) at 25 Feet	At 50 Feet	At 100 Feet	Ground-borne Noise Lv (VdB) (1 micro-inch/second at 25 Feet	At 50 Feet	At 75 Feet	At 100 Feet	At 150 Feet
Clam Shovel Drop (slurry wall)	0.202	0.071	0.025	94	85	80.5	76	71.5
Vibratory Roller	0.210	0.074	0.026	94	85	80.5	76	71.5
Hoe Ram	0.089	0.031	0.011	87	78	73.5	69	64.5
Large Bulldozer	0.089	0.031	0.011	87	78	73.5	69	64.5
Caisson Drilling	0.089	0.031	0.011	87	78	73.5	69	64.5
Loaded Trucks	0.076	0.027	0.010	86	77	72.5	68	63.5
Jackhammer	0.035	0.012	0.004	79	70	65.5	61	56.5
Small Bulldozer	0.003	0.001	0.0004	58	49	44.5	40	35.5

Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment, 2006
Note: These values are based on the field studies conducted by the FTA (2006). Actual vibration levels are dependent on construction procedures, soil and geologic conditions, and the structural characteristics of the receptors.
[1] LV = velocity level in decibels (VdB) referenced to 1 microinch per second and based on the root mean square velocity amplitude

As shown in Table 3.12-7, a vibratory roller has the highest groundborne vibration level of 0.21 in/sec PPV at 25 feet and 0.074 in/sec PPV at 50 feet. The vibratory roller generates a groundborne noise level of 94 VdB at 25 feet and 85 VdB at 50 feet. Vibration may be perceptible to a small number of people closest to the proposed inlet and bridge construction activities (within 50 feet). These closest receptors would be mobile beach users who would experience the vibration intermittently, not stationary residents inside buildings. The nearest residents would be approximately 1,000 to 1,500 feet to the north. At these more distant locations, vibration would be well below the Caltrans guidelines recommended standard of 0.2 in/sec PPV for the protection of normal residential buildings (Caltrans 2004), and less than the FTA guidelines recommended standard of 80 VdB maximum for human annoyance within residential buildings (FTA 2006). **Impacts would not be substantially adverse and would be less than significant (Criterion B).**

There would be no permanent noise-generating uses associated with the project. Long-term maintenance activities would be required every 3 to 4 years under this alternative to remove approximately 300,000 cy of material for placement on the adjacent Cardiff beach. Other maintenance requirements would be determined during the long-term monitoring program, and may include plant replacement, weed abatement, trash removal, and bank protection repair. Impacts associated with maintenance dredging and bank repair would be less than those described above under temporary impacts, and would generate temporary and negligible amounts of noise.

No substantial adverse impacts would occur. Impacts would be less than significant (Criterion C).

Alternative 1B

Because no new inlet would be constructed and Coast Highway 101 bridge work would be limited to retrofitting the existing structure, construction traffic operations and equipment noise associated with Alternative 1B would be less than those described under Alternative 2A. Specific trip generation numbers may vary by basin, but would not be in excess of numbers analyzed for Alternative 2A. Therefore, the noise traffic analysis discussed above for Alternative 2A is also applicable to this alternative. **Impacts would not be substantially adverse and would remain less than significant (Criteria A and D).**

Dredging and other construction noise and vibration associated with this alternative would be less than noise and vibration generated by Alternative 2A due to the smaller footprint and no construction of a bridge/inlet, resulting in a shorter period of project noise levels at sensitive receptors. While the noise standard of 75 dBA $L_{eq(8)}$ shared by the City of Encinitas, City of Solana Beach, and County of San Diego would not be violated during daytime hours, nighttime and weekend dredging activities are proposed within the lagoon. Variances would be required from the cities of Encinitas and Solana Beach to operate dredging equipment on Sundays, holidays, and Mondays through Saturdays between 7 p.m. and 7 a.m. With issuance of a variance, 24-hour operations could occur, and **impacts would not be substantially adverse under NEPA. Impacts would be considered significant under CEQA (Criterion A).**

Permanent noise from maintenance and vibration associated with Alternative 1B would be less than that described under Alternative 2A. The primary possible vibration source (new inlet and CBF) would not be constructed under this alternative. Maintenance of the channel would involve approximately 40,000 cy annually, would occur over 4 weeks during daytime hours, and would be focused under Coast Highway 101 and in the channel between Coast Highway 101 and the railroad. This would be similar to the existing inlet maintenance location, and would not exceed the City of Encinitas 75 dBA $L_{eq(8)}$. Short-term noise levels at sensitive receptors **would not be substantially adverse and would be less than significant (Criteria B and C).**

Alternative 1A

Construction traffic operations and equipment noise associated with Alternative 1A would be less than that for Alternative 1B because there would be less grading and material redistribution. The noise analysis related to traffic noise discussed above for Alternative 2A would be worst-case because it involves maximum grading and construction of a new bridge/inlet, and

Alternative 1A would have no substantial adverse or significant impacts. Dredging and other construction noise and vibration associated with Alternative 1A would be less than noise and vibration generated by Alternative 2A or Alternative 1B, due to the smaller footprint. Noise standards for the cities of Encinitas and Solana Beach and the County would not be violated during daytime hours. Nighttime and weekend dredging activities are proposed within the lagoon, outside of permitted hours. Variances would be required from the cities of Encinitas and Solana Beach in order to operate dredging equipment on Sundays, holidays, and Mondays through Saturdays between 7 p.m. and 7 a.m. With issuance of a variance, 24-hour operations could occur. **Impacts would be considered significant under CEQA (Criterion A only), even if a variance were issued. Temporary impacts would not be substantially adverse and would remain less than significant (Criterion D), as would vibration impacts (Criterion B). No substantial adverse impacts would occur under NEPA (all criteria).**

Permanent noise associated with routine inlet maintenance of Alternative 1A is expected to be similar to Alternative 1B and existing activities. **Impacts would not be substantially adverse and would remain less than significant (Criterion C).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in construction-related vehicle trips, modification of Coast Highway 101, or dredging activities, beyond existing periodic inlet opening. **The No Project/No Federal Action Alternative would not impact the noise environment and, therefore, would not be substantially adverse. Impacts would be less than significant (Criteria A, B, C, and D)**.

Materials Disposal

The SELRP is proposing to utilize many of the same sites for material placement that were analyzed as sites for the 2012 RBSP. The following discussion is largely based on the 2012 RBSP EA/EIR (SANDAG 2011). Figures 2-11A through 2-11F are useful for reference in this discussion, as well as Table 3.12-4.

The principal project noise at sensitive receptors during sand placement would be from construction equipment as the sandy material is moved around the beach and delivery pipelines are assembled and disassembled. Materials placement would possibly occur 24 hours per day, 7 days per week (similar to dredging). Both of the prior similar regionwide beach nourishment projects were constructed via the 24/7 approach.

At the materials placement sites, diesel engines would be used in bulldozers, loaders, forklifts, and cranes, as required. Noise levels vary, as equipment may come in different sizes and with engines of varying horsepower. Construction equipment noise levels also vary as a function of activity level or duty cycle. In a typical construction project (without pavement cutting or breaking), the loudest short-term noise levels are those of earthmoving equipment under full load, which would be approximately 85 dBA L_{max} at a distance of 50 feet from the source. However, with equipment moving from one point to another, work breaks, and idle time, the long-term noise level averages are lower than louder short-term noise events. For purposes of analysis of the proposed project, a maximum 1-hour average noise level of 80 dBA L_{eq} at 50 feet from the center of construction activities is assumed to occur (SANDAG 2011). Noise levels averaged over longer period such as 8 hours would be further reduced to below a 75 dBA $L_{eq(8)}$ for the same reasons; i.e., daily mobilization, moving from one point to another, work breaks including lunch, idle time, and daily demobilization over an 8-hour period. Materials placement is completed from one end of the site to the other, and work along approximately 100–200 feet of beach can typically be completed per day.

Representative noise levels were taken for the 2012 RBSP EA/EIR at Imperial Beach and Mission Beach during sand deposition/maintenance activities similar to those expected to occur with implementation of the proposed project (SANDAG 2011). Working noise levels were measured, and then ambient background noise was mathematically removed, to generate an estimated noise level of 74 to 77 dBA at a distance of 50 feet. Idling noise levels were estimated at 65 to 68 dBA at 50 feet. These are considered typical noise levels for beach equipment that may be used for the SELRP, and the referenced 80 dBA L_{eq} at 50 feet used in this analysis for impact determination is conservative. It is also noted that construction equipment is equipped with mandatory backup alarms, and sand distribution requires construction equipment to back up frequently. Therefore, the diesel engine noise would be accompanied at some times by backup alarm noise.

There may be a need to pump the sand/water slurry mixture for distances greater than 10,000 feet (Phases 1 and 3 only). Figure 3.12-1 identifies four possible pump locations: one by I-5, two near bends in the channel at the existing inlet and near the railroad bridge, and one near the possible new channel. Diesel engines for slurry pumps are typically housed in an enclosure that provides noise reduction. A noise level of 77 dBA at 50 feet is assumed (FTA 2006).

After materials placement/disposal is completed, no additional operational noise would occur; therefore, the temporary impact analysis below focuses on construction. **No significant permanent noise impacts would occur under the project alternatives for materials disposal/placement (Criterion C). No substantial adverse impacts would occur (NEPA).**

Alternative 2A

Moonlight Beach and Cardiff Beach – Beach Receptors

Sand placement sites at Moonlight Beach (Figure 2-11B) and Cardiff Beach (Figure 2-11C) have either beachfront residences, restaurants, or public open space at generally the same elevation as the sites. Residences at Moonlight Beach are within 50 feet of the nearest points of planned sand placement only at the northern and southern termini of the site. The vast majority of the site is adjacent to Moonlight Park. Residences in the area of Cardiff Beach are more than 900 feet north and south of the proposed sand placement site, but restaurants are within 50 feet of the sand placement. Dominant existing noise sources at these two locations are surf activity and traffic on nearby local roads. Ambient noise levels at sensitive receptors adjacent to these beaches range from 64 to 70 dBA L_{eq}.

During sand placement, the principal project noise at beachfront residences and restaurants would be from construction equipment. Sand placement activities may reach up to 80 dBA L_{eq} at the homes closest to the sand placement area at Moonlight Beach. When averaged over an 8-hour period, sand placement activities would include some periods with little or no equipment noise (e.g., when equipment repositions to different locations or shifts up or down the beach). Therefore, sand placement activities would have average noise levels of less than the 75 dBA $L_{eq(8)}$ guidance for the cities of Solana Beach and Encinitas and the County of San Diego.

Noise levels associated with sand placement would attenuate to ambient noise levels at distances of 100–175 feet from the spreading equipment. Sand placement activities would not be audible at the homes or the campground sites closest to the Cardiff Beach placement site.

When nighttime sand placement occurs within 100 feet of a residence, the change in noise environment is anticipated to disturb the sleep of some residents. This situation would occur only at the Moonlight Beach site and only at the northern and southern ends of the receiver site. A noise variance would be required to conduct nighttime sand placement. Closing windows would reduce the noise level, but the change in the volume and character of the noise may still disturb sleep. To minimize impacts to individual residents, they would be notified 1 week in advance of nighttime construction work that would occur within 100 feet, and work would last no longer than 3 consecutive nights within 100 feet (PDF-72). **No substantial adverse impacts would occur under NEPA. Impacts would be considered significant under CEQA for nighttime sand placement (Criteria A and D).**

Up to three booster pumps may be located within and near the Cardiff receiver site (Figure 3.12-1). If the pump is located at least 250 feet from a sensitive receptor, then the noise at the receptor would be 56 dBA L_{eq}. This noise would be at least 5 dBA below ambient noise levels. The pumps would range from approximately 250 to 1,500 feet from the nearest sensitive receptors, with the closest pump south of the existing inlet and south of the campground. **No substantial adverse impacts would occur under NEPA. Impacts would be considered significant under CEQA due to nighttime operations (Criteria A and D).**

<u>Leucadia and Solana Beach – Bluff Receptors</u>

Sensitive noise receptors at these sites are residences located on bluffs above the sand placement sites. Bluffs are on average 40 feet above the beach. Ambient surf noise levels at these residences are estimated at 63 to 66 dBA L_{eq}. Although these homes are also adjacent to the beach, the topography and a slightly greater distance from the residences to the sand replenishment areas result in more noise attenuation. Sand placement activities are expected to generate noise levels of 79 dBA L_{eq} at the edge of the bluff. It should be noted that the equipment noise would drop by 5 dB as soon as the direct line of sight to the receptor is broken. This is expected to occur at a point approximately 10 feet back from the edge of the bluff. Noise levels at the actual residential structures on the bluffs along the Leucadia and Solana Beach placement sites would vary. However, when averaged over an 8-hour period, sand placement activities would include some periods with little or no equipment noise, as described under Alternative 2A. Therefore, daytime sand placement activities would fall within the allowable construction noise level of 75 dBA $L_{eq(8)}$.

There could be materials placement during nighttime hours, and this change in noise environment is anticipated to disturb the sleep of some residents on the bluffs in both sites when within 100 feet of the activity. A noise variance would be required to conduct nighttime sand placement. To minimize impacts to individual residents, they would be notified 1 week in advance of nighttime construction work that would occur within 100 feet, and work would last no longer than 3 consecutive nights within 100 feet (PDF-72). **No substantial adverse impacts would occur under NEPA. Impacts would be considered significant under CEQA for nighttime sand placement (Criteria A and D).**

<u>Torrey Pines Beach</u>

The nearest residential receptors to this sand placement site front Carmel Valley Road and are approximately 2,000 feet to the north and east. Two major roadways and a rail line separate these receptors from the beach area. Even under favorable atmospheric conditions for noise transmission, project-related construction noise may only be faintly heard at these receptors. The placement site is located within a California State Park, which does not limit construction hours or have noise limits. Because there are no restrictions at the site and noise would be heard at the nearest residences only faintly, if at all, **impacts would not be substantially adverse and would be less than significant under CEQA (Criteria A and D).**

<u>SO-5 and SO-6</u>

The stockpile area at SO-5 is located approximately 2,500 feet from the nearest beachfront residents at the closest point in the City of Del Mar. Beachfront residents located adjacent to sand placement sites associated with SO-6 would be located a minimum of 3,350 feet away in the community of Cardiff. Even with the normal prevailing onshore wind, noise associated with offshore placement activities at these locations would not be readily audible at sensitive receptors. **Impacts would not be substantially adverse and would be less than significant (Criteria A and D).**

<u>Vibration</u>

The primary vibration source for the proposed project would be construction equipment used for sand-spreading activities. Sand alone, without silt or clay, is a poor medium for the transfer of vibrations, and the activity would not involve pile driving, soil compacting, jack-hammering, or demolition-related activities, which more typically generate vibration. Sensitive receptors in the vicinity of the materials placement sites may be aware of groundborne vibrations if they are within 50 feet of sand-spreading activities, but the vibrations would not be disruptive to residences or other sensitive uses. **Impacts would not be substantially adverse and would be less than significant (Criterion B).**

Alternative 1B

Although Alternative 1B proposes to use the same sand placement sites as Alternative 2A, impacts associated with Alternative 1B would be incrementally less, as less material would be deposited (200,000 fewer cy under this alternative). This may result in placement at fewer sites, a shorter duration for sand placement activities at a given site, or fewer trips to a stockpile location. Regardless, materials placement would occur at nighttime, outside of the hours allowed within the cities of Solana Beach and Encinitas. A variance would be required from the cities if sand placement on a city beach would occur at night, and **impacts would be considered significant under CEQA (Criteria A and D). No substantial adverse impacts would occur.**

Alternative 1A

Alternative 1A proposes to dispose of removed materials at LA-5. There are no sensitive receptors along the barge delivery route or at the site itself. **No noise impacts would occur and,**

therefore, would not be substantially adverse and would remain less than significant (Criteria A, B, and D).

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would not result in sand placement activities. **The No Project/No Federal Action Alternative would not impact the noise environment or cause ground vibration and, therefore, noise impacts would not be substantially adverse and would remain less than significant (Criteria A, B, and D).**

3.12.4 Avoidance, Minimization, and Mitigation Measures

Due to nighttime dredging and materials placement activities, significant impacts have been identified under CEQA for each of the alternatives due to lagoon restoration activities and materials disposal/reuse activities associated with the SELRP. No substantial adverse impacts per NEPA would occur. Design features have been incorporated into the project to minimize equipment noise during construction at nearby residences, including housing exposed engines and ensuring equipment has effective mufflers. At materials placement sites, construction would be limited to 3 consecutive nights within a distance that could disturb sleep at a given residence (100 feet). Even with implementation of these measures, nighttime construction outside of allowed hours would result in significant impacts. Noise walls and limiting dredging and materials placement activities to daytime hours were considered to reduce this impact, but rejected, as described below. Noise impacts from nighttime dredging and materials placement remain significant and unavoidable with implementation of Alternative 2A, Alternative 1B, and Alternative 1A.

The use of noise walls was considered as an option for noise reduction. However, the expanse of the lagoon and the continual moving dredge make the placement of noise walls less effective, also considering that many noise-sensitive receptors are located on the bluffs and hillsides surrounding the lagoon and would not receive beneficial noise reduction from a noise wall located at lower elevations. At sand placement sites, the active work areas on the beaches would shift approximately 100–200 feet per day. The construction of noise walls is not efficient when left in place for a very short time before needing to be removed and relocated to another location to keep pace with the noise source. For these reasons, the use of noise walls to reduce noise levels at sensitive receptors during nighttime construction activities was found less effective than controlling noise at the mobile noise source, such as with engine enclosures, where possible (e.g., on dredge equipment).

Limiting dredging and materials placement activities to daytime hours was considered to reduce significant impacts associated with nighttime construction to less than significant. If such limits were implemented, however, overall construction time to implement the SELRP would be extended substantially. Dredging equipment operates most efficiently if run continually since dredged material is entrained in a slurry of water and sand and transported through a pipeline and into a barge. Once at a placement site, the material is again transported through a pipeline to the disposal/placement site in a slurry mix of water and sand (e.g., offshore, nearshore, or beach). If dredging is halted once initiated, the pipes must be cleared to avoid having sand settle out and clog pipelines. Therefore, the efficiency of dredging operations is decreased substantially as pipelines are cleared and then primed at the end and start of each dredge period. In addition, for sand placement to occur at sites not directly adjacent to the dredge area, material is placed into a barge and then transported to the placement site. Once at the site, the material is offloaded through a second pipeline. For beach placement, spreading the material and potentially extending the discharge pipeline must occur before another barge load can be placed on the beach. The sequential nature of beach placement means that if activity is limited to daytime hours and a placement cycle can take up to 5–6 hours, then only a single cycle could occur within a typical 8-hour workday as opposed to completing 4–5 placement cycles within a 24-hour period with continuous dredging/placement activities. This substantial reduction in efficiency leads to an even more substantial increase in schedule. The offshore/nearshore disposal and beach disposal require the installation of pipelines in the surf zone. When these pipelines are left in place in high wave environments they can be buried, broken, or plugged; therefore, less exposure time means less chance of those problems. Extending the schedule also exposes the public to a longer period of equipment and pipe on the beach (at least three times longer). Extending the schedule would also require longer periods of inundation within the lagoon, resulting in potentially higher impacts to vegetation, noise-sensitive species, and trails and recreational amenities. Extending the schedule would also lead to substantially higher construction cost.

3.12.5 Level of Impact after Mitigation

CEQA conclusions: Noise impacts associated with nighttime implementation of the SELRP would be significant and cannot be mitigated to less than significant.

NEPA conclusions: No substantial adverse noise impacts would occur with implementation of the SELRP.

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3.13 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

Under NEPA, "economic" and "social" effects are environmental consequences to be examined (40 CFR Section 1502.16 and 40 CFR Section 1508.8). Under CEQA, the focus of an EIR is primarily on potential changes to the "physical conditions," which include land, air, water, flora, fauna, population, housing, noise, and objects of historic or aesthetic significance (PRC Section 21060.5; CCR Title 14 Section 15358(b) and Section 15382). The proposed project is to enhance and restore the physical and biological functions and services of San Elijo Lagoon by increasing the tidal prism to support a diverse range of native intertidal and transitional habitats, and there would be no physical changes to population or housing.

In addition to examining potential social and economic impacts to local and regional populations as a whole, any NEPA document must consider the potential for disproportionate environmental impacts to minority or low-income populations, as well as potential disproportionate environmental health and safety risks to children, in order to comply with relevant federal executive orders. Those analyses are contained in Section 3.13.6 of this EIR/EIS, but the supporting demographic information on population, ethnicity, and income is provided in this section.

The primary social and economic-related focus of the proposed project, as stated in the Purpose and Need of this EIR/EIS (Section 1.2), is intended to enhance a valuable public resource that serves local residents in a number of ways. These include maintaining more than 7 miles of public hiking trails for recreational activities within habitation areas for sensitive species, including endangered plants and animals, and resident and migratory wildlife, thereby providing benefits to the entire regional economy.

This section also presents information on commercial fisheries, the local social and economic sector most likely to be adversely impacted by the materials disposal/reuse component of the proposed project. During the 2012 RBSP impact analysis, stakeholder concerns regarding sand movement and potential impacts to commercial fishing resources were addressed. Since this project includes sand placement at a number of the same sites in the region, fisheries information from the 2012 RBSP is referenced and certain data are updated.

This section contains census data regarding population and income. Commercial fisheries and the relative economic value of various species are discussed in Section 3.13.3. Kelp harvesting value is addressed in Section 3.13.3, followed by recreational fishing and diving value in Section 3.13.4.

3.13.1 AFFECTED ENVIRONMENT

In terms of its broad economic contribution, San Elijo Lagoon provides habitat for sensitive species, including endangered plants and animals, and resident and migratory wildlife. San Elijo Lagoon also offers 7 miles of public hiking trails for recreational activities to local community members and visitors, providing benefits to the entire regional economy.

To provide a localized socioeconomic context for the proposed project, this section presents information on population and income in the project area for two distinct geographies: (1) the area immediately surrounding the lagoon that may be affected by lagoon restoration activities, and (2) the area immediately surrounding materials disposal/reuse sites along the San Diego County coast.

To meet the specific intent of Executive Order 12898 on Environmental Justice (59 *Federal Register* 7629 (1994)), it is necessary to consider the minority and economic status of the population surrounding the San Elijo Lagoon restoration area and materials placement sites. To allow for a subsequent assessment of potential disproportionate impacts to minority populations and low-income populations, it is necessary to compare the same type of demographic and income information for the local jurisdiction and larger region. Therefore, these data provide information on population, ethnicity, median income, and poverty for the area around San Elijo Lagoon and each of the placement sites compared to the local jurisdiction and the San Diego County region. Housing and employment data, often presented in socioeconomic sections of NEPA documents, are not provided in this section as the proposed project is not considered likely to have any direct impact on either housing or employment in the immediate area. Potential positive benefits to employment as a result of construction (temporary) and enhanced recreational and tourism opportunities (long-term) would likely be felt at a regional level.

Census tracts are the standard localized units of land-based analysis for these types of data. The San Elijo Lagoon restoration area is contained within five census tracts, while the materials disposal/reuse study area spans eight census tracts. These census tracts are listed in Table 3.13-1. Some tracts contain all or portions of more than one placement site and some placement sites straddle two census tracts. Some of the census tracts located within the San Elijo Lagoon study area overlap with some census tracts containing disposal/placement sites.

The data presented in this section for census tracts, local jurisdictions, and the region as a whole are from the U.S. Census 2010 100 percent survey or the U.S. Census American Community Survey 2006-2010 5-Year Estimates, depending on data availability.

Table 3.13-1
Census Tract Numbers and Jurisdictional City Boundaries for San Elijo Lagoon and Proposed Materials Placement Sites

City	Census Tract	Study Area
Encinitas; Solana Beach	173.03	San Elijo Lagoon Study Area
Encinitas; Solana Beach	173.05	San Elijo Lagoon Study Area
Encinitas	174.01	San Elijo Lagoon Study Area
Encinitas	174.04	San Elijo Lagoon Study Area
Encinitas; Rancho Santa Fe; Unincorporated San Diego County	171.06	San Elijo Lagoon Study Area
Encinitas; Solana Beach	173.03	Proposed Materials Placement Site: Cardiff Beach
Encinitas	177.02	Proposed Materials Placement Site: Moonlight
Encinitas	175.01	Proposed Materials Placement Site: Moonlight
Solana Beach	173.04	Proposed Materials Placement Site: Solana Beach
Del Mar	172	Proposed Materials Placement Site: Solana Beach
Encinitas; Solana Beach	173.03	Proposed Materials Placement Site: Solana Beach
Encinitas; Carlsbad	177.01	Proposed Materials Placement Site: Leucadia
San Diego	83.12	Proposed Materials Placement Site: Torrey Pines

Source: U.S. Census Bureau 2010

San Elijo Lagoon Study Area

Population/Ethnicity

Table 3.13-2 shows population characteristics, including total population and race/ethnic distribution, for the census tracts contiguous with the San Elijo Lagoon study area. The table also provides the same ethnic and racial information for adjacent jurisdictions as well as at the county level to facilitate comparison between the affected area and a broader context.

As shown, the total population within the census tracts of the San Elijo Lagoon study area ranges from 2,969 in tract 173.05 to 6,338 in tract 174.04. The minority population includes those who self-identify as Black, Hispanic, Native American, Asian, Native Hawaiian, “some other race,” and “two or more races.” Minority populations within the San Elijo Lagoon study area range from 12.1 percent within track 171.06 to 23.2 percent within tract 174.04. Those who self-identify as Hispanic make up the majority of the minority population within the San Elijo Lagoon study area, ranging from 40.3 percent of the minority population within tract 173.05, to 71.1 percent within tract 174.04. The minority populations of Encinitas, Rancho Santa Fe, and Solana Beach are 21.2 percent, 10.6 percent, and 22.7 percent, respectively. In San Diego County, 1,595,266 or 51.5 percent of the population is minority, with 62.1 percent of minorities self-identifying as Hispanic. When compared to the population of greater San Diego County, only census tract 174.04 has a proportion higher than its adjacent jurisdiction (Encinitas). However, the percentage of minority residents is substantially lower than the proportion seen at the county level; those census tracts composing the San Elijo Lagoon study area cannot be considered a high minority population area.

Table 3.13-2
Population and Ethnicity for San Elijo Lagoon Study Area

Study Area		City	White	Black	Hispanic	Other	Total	Total Minority	Percent Minority
Tract	171.06	Encinitas; Rancho Santa Fe; Unincorporated San Diego County	4,372	17	321	263	4,973	601	12.1%
	173.03	Encinitas; Solana Beach	2,557	10	283	168	3,018	461	15.3%
	173.05	Encinitas; Solana Beach	2,542	13	172	242	2,969	427	14.4%
	174.01	Encinitas	4,600	21	375	359	5,355	755	14.1%
	174.04	Encinitas	4,868	29	1,045	396	6,338	1,470	23.2%
City	Encinitas		46,881	316	8,138	4,183	59,518	12,637	21.2%
	Rancho Santa Fe		2,788	10	176	143	3,117	329	10.6%
	Solana Beach		9,944	56	2,048	819	12,867	2,923	22.7%
County	San Diego County		1,500,047	146,600	991,348	457,318	3,095,313	1,595,266	51.5%

Source: U.S. Census Bureau 2010

Income

Information on median household income, total in poverty, and percentage in poverty in the census tracts, jurisdictional cities contiguous with the San Elijo Lagoon study area, and the whole of San Diego County, is presented in Table 3.13-3.

Table 3.13-3
Median Household Income and Poverty Rates for San Elijo Lagoon Study Area

Study Area		City	Median Household Income	Total in Poverty	Percentage in Poverty
Tract	171.06	Encinitas; Rancho Santa Fe; Unincorporated San Diego County	$139,444	268	6.5%
	173.03	Encinitas; Solana Beach	$121,676	427	12.4%
	173.05	Encinitas; Solana Beach	$90,430	77	2.7%
	174.01	Encinitas	$88,342	688	12.2%
	174.04	Encinitas	$84,744	314	5.0%
City	Encinitas		$86,845	4,654	8.0%
	Rancho Santa Fe		$188,859	92	3.2%
	Solana Beach		$86,845	966	7.6%
County	San Diego County		$63,069	361,248	12.3%

Source: U.S. Census Bureau 2010

The median household income of the San Elijo Lagoon study area by tract ranges from $84,744 in tract 174.04 to $139,444 in tract 171.06. The median household income is $86,845 in Encinitas, $86,845 in Solana Beach, and $188,859 in Rancho Santa Fe. The San Diego County median household income is $63,069. The total households in poverty by tract range from 77 or 2.7 percent of tract 173.05, to 688 or 12.2 percent of tract 174.01. The highest percentage of households in poverty is within tract 173.03 at 12.4 percent or 427 households. Rancho Santa Fe has 92 households or 3.2 percent of its population in poverty, Solana Beach has 966 households or 7.6 percent of its population in poverty, and Encinitas has 4,654 households or 8.0 percent of its population in poverty. Within the whole of San Diego County, 361,248 households are living in poverty, representing 12.3 percent of the total population. As these data illustrate, the number of households in poverty within the tracts and jurisdictional cities contiguous with the San Elijo Lagoon study area is less than overall San Diego County, with the exception of tract 173.03 with a 0.1 percent higher poverty rate. When compared to the median household income and poverty rates of greater San Diego County, the census tracts and jurisdictions contiguous with the San Elijo Lagoon study area cannot be considered a high poverty area.

Materials Disposal/Reuse Study Area

Population/Ethnicity

Table 3.13-4 shows population characteristics, including total population and race/ethnic distribution, for the census tracts contiguous to the possible materials placement sites. The table also provides the same ethnic and racial information for adjacent jurisdictions as well as at the county level to facilitate comparison between the affected area and a broader context.

As shown in Table 3.13-4, the total population within the census tracts of the materials placement study area ranges from 2,777 in tract 177.02 to 5,275 in tract 177.01. The minority population, which includes those who self-identify as Black, Hispanic, Native American, Asian, Native Hawaiian, “some other race,” and “two or more races,” percentage within the materials placement study area ranges from 10.3 percent within track 172 to 49.6 percent within tract 173.04. Those who self-identify as Hispanic make up the majority of the minority population within the materials placement study area, ranging from 39.9 percent of the minority population within tract 83.12 to 82.2 percent within tract 173.04. The minority populations of Del Mar, Encinitas, Solana Beach, Carlsbad, and San Diego are 9.3 percent, 21.2 percent, 22.7 percent, 25.1 percent, and 54.9 percent, respectively. In San Diego County, 1,595,266 or 51.5 percent of the population is minority, with 62.1 percent of minorities self-identifying as Hispanic. When compared to their respective containing jurisdictions, census tract 173.04 has a much higher proportion of minority residents than Solana Beach, with a difference of 26.9 percent. This can be likely attributed to Eden Gardens, a historic barrio in Solana Beach with an origin traced to Mexican farmers hired by neighboring ranch owners in the 1920s. Although the percentage is lower than what is present for the region, census tract 173.04 is considered a high minority population area for the purposes of environmental justice analyses.

Income

Information on median household income in the census tracts contiguous with the placement sites, as well as median incomes and poverty rates of the contiguous jurisdictional cities and the county in general, is presented in Table 3.13-5.

Table 3.13-4
Population and Ethnicity for Materials Placement Study Area

Study Area		City	White	Black	Hispanic	Other	Total	Total Minority	Percent Minority
Tract	83.12	San Diego	2,968	21	264	376	3,629	661	18.2%
	172	Del Mar	3,758	9	175	204	4,146	388	10.3%
	173.03	Encinitas; Solana Beach	2,557	10	283	168	3,018	461	15.3%
	173.04	Solana Beach	3,681	20	1,501	306	5,508	1,827	49.6%
	175.01	Encinitas	2,374	13	226	156	2,769	395	16.6%
	177.01	Encinitas; Carlsbad	3,997	30	937	311	5,275	1,278	24.2%
	177.02	Encinitas	2,329	3	310	135	2,777	448	16.1%
City	Del Mar		3,772	9	175	205	4,161	389	9.3%
	Encinitas		46,881	316	8,138	4,183	59,518	12,637	21.2%
	Solana Beach		9,944	56	2,048	819	12,867	2,923	22.7%
	Carlsbad		78,879	1,232	13,988	11,229	105,328	26,449	25.1%
	San Diego		589,702	82,497	376,020	259,183	1,307,402	71,770	54.9%
County	San Diego County		1,500,047	146,600	991,348	457,318	3,095,313	1,595,266	51.5%

Source: U.S. Census Bureau 2010

Table 3.13-5
Median Household Income and Poverty Rates for Materials Placement Study Area

Study Area		City	Median Household Income	Total in Poverty	Percentage in Poverty
Tract	83.12	San Diego	$138,703	126	4.0%
	172	Del Mar	$112,566	148	3.7%
	173.03	Encinitas; Solana Beach	$121,676	427	12.4%
	173.04	Solana Beach	$68,606	405	8.0%
	175.01	Encinitas	$69,643	314	12.2%
	177.01	Encinitas; Carlsbad	$78,279	615	12.4%
	177.02	Encinitas	$57,602	236	8.6%
City	Del Mar		$112,566	148	3.7%
	Encinitas		$86,845	4,654	8.0%
	Solana Beach		$86,908	966	7.6%
	Carlsbad		$84,728	7,179	7.2%
	San Diego		$62,480	174,763	14.1%
County	San Diego County		$63,069	361,248	12.3%

Source: U.S. Census Bureau 2010

The median household income of the materials placement study area by tract ranges from $57,602 in tract 177.02 to $138,703 in tract 83.12. The median household income is $62,480 in San Diego, $84,728 in Carlsbad, $86,845 in Encinitas, $86,908 in Solana Beach, and $112,566 in Del Mar. The San Diego County median household income is $63,069. The total number of households in poverty by tract range from 126 (4.0 percent) of tract 83.12, to 615 (12.4 percent) of tract 177.01. The highest percentage of households in poverty is 12.4 percent in both tracts 173.03 and 177.01. Del Mar has 148 households or 3.7 percent of its population in poverty, Carlsbad has 7,179 or 7.2 percent, Solana Beach has 966 or 7.6 percent, Encinitas has 4,654 or 8.0 percent, and San Diego has 174,763 or 14.1 percent. Within the whole of San Diego County, 361,248 households are living in poverty, representing 12.3 percent of the total population. As these data illustrate, the number of households in poverty within the tracts and jurisdictional cities contiguous with the materials placement study area are analogous to overall San Diego County, with the exception of tracts 173.03, 177.01, and the City of San Diego, which have a 0.1, 0.1, and 1.8 percent higher rate, respectively. When compared to the median household income and poverty rates of their contiguous jurisdictions and greater San Diego County, the census tracts contiguous with the materials placement study area cannot be considered a high poverty area.

Commercial Fisheries

San Diego County supports a substantial commercial fishing industry and is also a center for sport and recreational fishing and diving activities. This section describes the commercial fishing activity in the San Diego region and in offshore areas, specific to the SO-5, SO-6, and LA-5 materials stockpiling and disposal sites. The information presented in this section has been taken largely from the 2012 RBSP, which assessed the impacts to commercial fisheries as a result of the dredging and materials transportation activities associated with that project (SANDAG 2011). As discussed elsewhere in this report, SO-5 and SO-6 were borrow sites assessed during the 2012 RBSP analysis; thus, the commercial fisheries description here is applicable and relevant to the proposed SELRP. The primary information referenced here was gathered from CDFW catch statistics, recent work conducted by CDFW for the Marine Life Protection Act, NMFS, and the San Diego Unified Port District (SDUPD).

Regional Overview

Historically, the commercial fishing industry has played a major, although declining, role in the region. The San Diego County major ports include San Diego, Mission Bay, Oceanside, and Point Loma. Aquaculture takes place in Buena Vista and Agua Hedionda lagoons in Carlsbad. In 2007, there were 153 commercial vessels, 145 commercial fishermen, 53 fish-related businesses, and one aquaculture business that reported landings in these ports (California Marine Life Protection Act Initiative 2009).

Although the commercial fishing industry has seen a steady decline in recent decades, the industry is predicted to undergo a substantial revitalization. The decline of the commercial fishing industry has been attributed to competition from other areas and a variety of regulatory, economic, and environmental factors. In terms of participants, the commercial fishing industry was reduced by more than 70 percent from the late 1970s to 1998 (San Diego Unified Port District 1998). During that period, the number of fishing vessels in the San Diego region declined by about 67 percent. In the recent past, it was anticipated that an opportunity may exist for future growth. Although the number of fishing vessels and fishermen in the San Diego region declined from 1999 to 2006, a slight increase occurred from 2006 to 2007 (California Marine Life Protection Act Initiative 2009). One reason for the potential upswing was that the global appetite for seafood had more than doubled over the past 30 years, and a demand for local, sustainable seafood was growing (Unified Port of San Diego 2012).

Employment for fishers and fishing-related workers in San Diego County was projected to increase from 130 to 170 jobs by 2016, surpassing projected employment in the industry for areas such as Los Angeles County and Monterey County (California Employment Development Department 2010); however, more recent employment projections computed since the economic recession occurred suggest that employment for fishers and fishing-related workers will stay constant in San Diego County into 2018 (and actually decrease in Monterey and Los Angeles counties) (California Employment Development Department 2012). The four San Diego ports earned nearly $200 million in the period from 1985 to 2008 (in 2009 dollars). In 2011 alone, commercial fishing brought the region nearly $8 million in ex-vessel value, the price paid to fishermen (California Department of Fish and Game 2012).

Several species of invertebrates and fish found in the project area are economically valuable marine resources. The composition, volume, and value of the local commercial catch have not been stable over time, however, as measured by a number of indices. The composition and relative economic importance of the local fishery has changed as well, with the largest changes attributable to the local decline of the tuna fishery. In 1950, the San Diego County area produced the second-largest volume and value of commercial fish landings among California’s six primary fisheries statistical areas, accounting for 25 percent and 35 percent of the state’s total commercial fishing landing volume and value, respectively. By 1996, the San Diego County statistical area had dropped to being the state’s lowest producer, and area landings had declined to 3 percent of the state’s total value of landings. In 2011, this percentage was similar at 3.8 percent of the state’s total commercial fishing landing value (California Department of Fish and Game 2012).

In 1980, various species of tuna composed 96 percent of San Diego’s volume and value of landings, which demonstrates the role of tuna in these large-scale changes. By 1990, this figure had dropped to less than 1 percent of volume and value of local landings. This trend has continued into recent years. From 1998 to 2008, species such as the California spiny lobster, red sea urchin, California sheephead, squid, and prawn-shrimp pulled in the highest dollar amount of commercial landings. In 2008, the amount of squid harvested increased tremendously in both volume and value (California Department of Fish and Game n.d.).

In the last three decades, the California fishing industry generally harvested less catch, required fewer fisherman, and utilized a smaller fleet in both boat length and numbers to bring the catch to port. Locally, the number of fisherman and boats has declined significantly, but the value of the landings declined only slightly from the 1980s to 1990s (San Diego Unified Port District 1998). Following this trend, the volume of landings in the region decreased slightly from 2000 to 2008, but the total value of landings increased by 9 percent (CDFG n.d.) and was nearly $205 million in 2011 (CDFG 2012).

In addition to fishery data provided by SDUPD, more specific and regional fishery data are provided by CDFW. These include annual commercial fishery catch and landings in volume (pounds) and value (dollars) by a number of species. Landings are reported by area and port, and catch data are reported by fish block. Fish blocks are statistical areas normally 10 minutes of longitude by 10 minutes of latitude, with blocks adjacent to shore being somewhat smaller, with the area of specific blocks determined by how the shoreline intersects the block area.

Relevant fish blocks and their corresponding shorelines within the project area include blocks 842 (Torrey Pines to Del Mar), 821 (Encinitas), and 878 (offshore, west of Chula Vista and Imperial Beach). Proposed offshore stockpiling site SO-5 is located in fish block 842, offshore stockpiling site SO-6 is located in fish block 821, and materials disposal site LA-5 is located in fish block 878. All fishing gear types are combined and include hook and line, longline, troll, harpoon, trap, seine, and trawl. Assignation of a species to a specific block is not always completely accurate, and fluctuations in annual catches are substantial. Determining the cause of these fluctuations can be difficult due to the complex set of variables that affect fish movements and abundance.

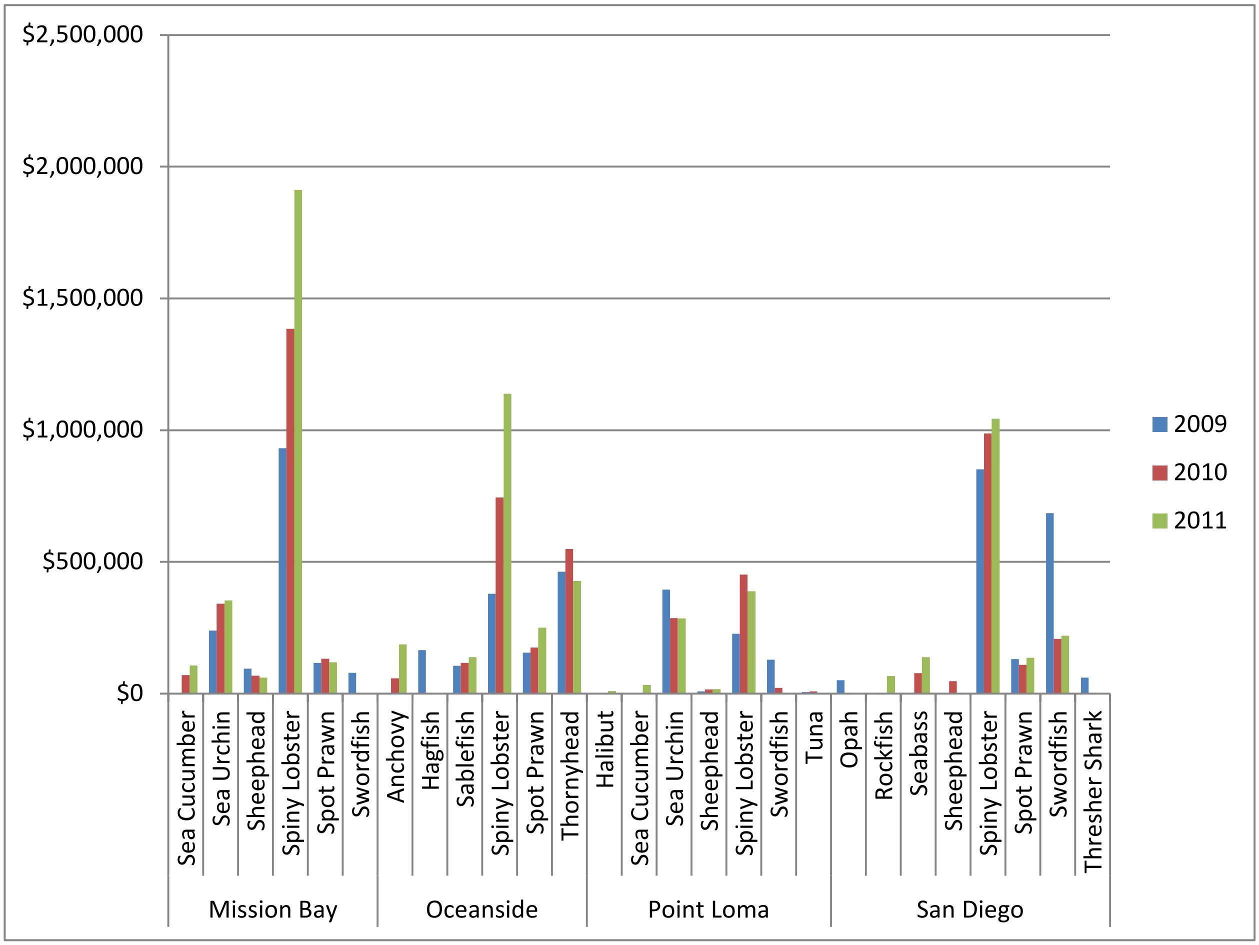
San Diego Commercial Fishing Catch Volume and Value for Nearshore or Potential Nearshore Species by Port

Recently compiled data for the 2012 RBSP showed that the total value of San Diego County commercial landings from 1999 to 2008 for species that occur nearshore or potentially nearshore was $38 million, or an annual average of $3.8 million (SANDAG 2011). This dollar amount is ex-vessel value (e.g., whole fish, wholesale price), and the final economic value is about four to five times higher. During this period, commercial landings at Oceanside represented 34.5 percent of the total San Diego County landings. The commercial catch and value changes significantly from year to year. For example, the value of landings for San Diego County in 2008 was $2.5 million (Port of San Diego plus Oceanside), with Oceanside representing 60 percent of the total. This was in sharp contrast to 1999 when the total landings were $1.1 million with Oceanside accounting for 22.1 percent of that figure.

Figure 3.13-1 shows recent data for the period 2009 to 2011 for the top five species (by value) for the four major ports in San Diego County: Mission Bay, Oceanside, Point Loma, and San Diego. Even limited to the top five species per year, the annual average value landed for these four ports averaged to just over $6 million per year. The primary species by value was spiny lobster, which was valued annually at between approximately $2.4 million (2009) and $4.5 million (2011), with a 3-year total of over $10.4 million. Sea urchin was second in value for the years 2009 to 2011, with a total of $1.9 million over the 3-year span. Thornyhead ($1.4 million), swordfish ($1.34 million), and spot prawn ($1.32 million) rounded out the top five species for total value between 2009 and 2011.

It should be noted that, unlike fish block harvest data, the commercial port landing data of nearshore or potential nearshore species for San Diego County include catch from the Channel Islands as well as from areas along the mainland. The proportion of catch attributable to areas other than the San Diego County coastline cannot be determined from available records.

Figure 3.13-1
Value for the Top Five Species, by San Diego County Port, 2009–2011



Source: CDFG 2012, 2011, 2010

Economic Importance of Nearshore Species by Fish Block

Table 3.13-6 provides information recently published as part of the 2012 RBSP analysis. The table shows a breakout of ex-vessel value of most valuable nearshore species for the relevant fish blocks for the period 1999 to 2008 to facilitate comparisons by block. Clearly, lobster and spot prawn are the most valuable in terms of dollar amount.

Table 3.13-6
San Diego County Average Landings by Fish Block for 1999 to 2008
Most Valuable Nearshore Species Average Values (U.S. Dollars)

Species	Area Name and Fish Block Number: Encinitas/Solana Beach Block 821 (SO-6)	Area Name and Fish Block Number: Del Mar/Torrey Pines Block 842 (SO-5)	Totals
Lobster	$226,639	$125,563	$352,202
Urchin	$3,470	$1,411	$4,881
Rock Crab	$3,912	$9,133	$13,045
Swordfish	$0	$1,583	$1,583
Spot Prawn	$1,521	$48,714	$50,235
Sheephead	$6,113	$14,754	$20,867
Squid	$0	$28,530	$28,530
Total	$241,655	$229,688	$471,343

Source: SANDAG and U.S. Army Corps of Engineers 2011

In terms of geographic distribution of valuable nearshore species, the value of species caught in blocks 821 and 842 is relatively small compared to other nearby blocks, including Block 860 (La Jolla to Point Loma). As described in the 2012 RBSP, Block 860 accounted for 75.0 percent of the total value for the species listed. Within blocks 821 and 842, spiny lobster is top species in terms of value at $352,202, which was 65.1 percent of the total value for the species listed over the 10-year span. Spiny lobster value was higher in Block 821 (64.3 percent of the value between the two blocks), while spot prawn value was substantially higher in Block 842 (96.7 percent of the value between the two blocks).

Recent data are unavailable for Block 878, in which LA-5 is located. However, the original EIR for LA-5 stated that Block 878 "has not been very productive for commercial fishing." Specifically,

> The total catch in Block 878 in 1981 amounted to approximately 235,000 pounds of fish and invertebrates. Even though it represented a four-fold increase over the 1976-77 catch, it still amounted to only one-fourth of the average catch per block in the San Diego area. Blocks 860 and 861, to the north of this block are, however, much more productive, partly due to the presence of rock substrate, kelp beds and other fish habitat. (EPA 1987)

<u>Kelp Harvesting</u>

Kelp harvesting operations also occur in the proposed project area. Giant kelp (*Macrocystis pyrifera*) is found all along the western coast of the United States. Off the southern California coast, kelp is found on rocky substrate in wave-exposed areas at depths of 20 to 120 feet. Areas of particular kelp abundance in the San Diego region include La Jolla Point and Point Loma (California Marine Life Protection Act Initiative 2009). Kelp harvesting has occurred in California since 1911 and involves the use of cutter barges, which harvest the upper kelp canopy down to a depth of about 4 feet below the water surface. Kelp beds are located near some of the offshore placement sites and beaches. Kelp forests are not only important to sport fishermen, commercial fishermen, and kelp harvesters; they are also important to recreational divers, photographers, and tourists who value them for aesthetic reasons (CDFG 2004).

A number of factors can influence the vitality of kelp beds. Grazers such as the halfmoon, opaleye, perch, sea urchins, and various crustaceans can affect the growth of kelp. Storms frequently pull kelp plants off the substrate. Human-caused environmental stress is brought about by pollution and sedimentation from power plants, sewage discharge, and coastal development practices (CDFG 2004). Sedimentation of the rocky bottom has also been known to retard kelp growth and bury young plants, preventing development and reproduction (Glantz 1999).

The harvesting of kelp in the state is regulated by CDFW. The State of California has imposed a number of restrictions on harvesting activities, both commercial and recreational. In recent years, the alginate industry has considerably reduced its demand for California kelp, and commercial kelp harvest (in weight) decreased by 96 percent from 2002 to 2007. The dramatic decrease in kelp harvesting after 2005 resulted from the departure of a large kelp harvesting company, which moved its operations overseas (California Marine Life Protection Act Initiative 2009).

Two kelp beds, one located from the California/Mexico international border to southern tip of San Diego Bay, and one located from the southern tip of San Diego Bay to the southern tip of Point Loma, are considered open, which means they may be harvested by anyone with a kelp harvesting license. Kelp beds at Point Loma, Mission Bay, Scripps Pier, and the San Dieguito River to middle of Loma Alta Lagoon at south Oceanside are considered leasable and provide the exclusive privilege of harvesting to the lessee (California Marine Life Protection Act Initiative 2009). Recent CDFW records suggest that Knocean Sciences, a producer of kelp oil and kelp concentrate, has an exclusive harvest agreement for kelp near Point Loma at a rate of $3.00 per wet ton (CDFG 2012).

Recreational Fishing and Diving

A wide range of marine recreational fishing and diving opportunities exist along the San Diego coast. These include surf and shoreline fishing, pier fishing, party boat fishing, private boat fishing and diving, and skin/SCUBA diving. According to NOAA (2012), the direct economic impact of recreational fisheries in California totaled more than $2.0 billion in 2009, with over $1.0 billion more in value-added impacts. Of the $2.0 billion in direct economic impact, durable equipment accounted for $1.5 billion, shore activities such as pier and beach fishing accounted for $263 million, charter boats accounted for $133 million, and private boats accounted for $113 million. Recreational fisheries employ nearly 12,000 people in the state.

The most common target species for beach fishing were barred surfperch, yellowfin croaker, opaleye, and jacksmelt. Fishing from man-made structures target Pacific mackerel, Pacific sardine, northern anchovy, queenfish, and jacksmelt. Rented and chartered boat fishing targets offshore and pelagic species, especially mackerel, croaker, bass, and rockfish (California Marine Life Protection Act Initiative 2009). There is a small contingent of operators that specialize in half-day and 1-day charters that typically fish the nearshore areas and kelp beds. These operators target sand and kelp bass and California halibut. Oceanside Harbor has a few boats that specialize in this fishery while Mission Bay and San Diego Bay have a large charter fleet. Fishing occurs year-round in the study region, although effort markedly increases in the summer months, peaking in July. According to estimates produced by CDFW's California Recreational Fisheries Survey, over 40 percent of fishing trips occur in the months of June, July, and August (California Marine Life Protection Act Initiative 2009).

Parnell et al. (2010) conducted angler interviews in San Diego County and found differences in fishing behavior among recreational fisherman originating from the two different locations (landings). Results of the Parnell et al. (2010) study indicated fisherman launching in San Diego Bay primarily fished San Diego Bay or offshore of Point Loma, the latter primarily targeting demersal fish within the kelp forest. In contrast, fisherman launching in Mission Bay primarily fished in Mission Bay or offshore of La Jolla, primarily targeting more transitory pelagic species just offshore of the kelp forest to the edge of the nearshore shelf outside of the kelp forest. Recreational catch in San Diego from Commercial Passenger Fishing Vessel data show that an average of 54,213 anglers participated in the recreational fishery in San Diego between 2003 and 2007, catching an average of 209,540 fish.

Sport diving and spearfishing activities mostly occur in the nearshore waters, and diving trips in San Diego in the early 1990s numbered about 30,000 per year. It is assumed that this rate has increased as the rate of Professional Association of Diving Instructors (PADI) certification has increased substantially since 1990 (NMFS 1991; PADI 2012). Most diving occurs in habitats rich in marine life, especially kelp beds and rocky reefs. Much of the diving in San Diego involves trips to locations only accessible by boat, including offshore kelp beds, the vessels intentionally sunk as artificial reefs in "Wreck Alley" off of Mission Beach, and even offshore islands and banks. Shoreline diving is also popular.

The most common local beach diving locations include the submarine canyon off La Jolla Shores (where dive instruction classes are typically taught), La Jolla Cove (due to the abundant undersea life there attributable in part to the area's protected underwater reserve status), and numerous other sites along the coast from La Jolla to Oceanside where public access to nearshore reefs is convenient. Photography, spearfishing for kelp bass and halibut, and diving for spiny lobsters are three of the more popular diving activities. Spearfishing can involve either skin diving (also known as snorkeling or free diving) or SCUBA gear. In addition to California spiny lobster, divers also harvest rock scallops, marine snails and limpets, various species of clams, and in recent years, Humboldt squid (California Marine Life Protection Act Initiative 2009). Sport diving for lobster usually involves SCUBA diving as the lobster must be captured by hand without the use of snares or any other tools, and individual lobster are often found under reef ledges, in crevices between rocks, or in other difficult to access areas. Some lobster diving takes place at night, as lobsters are more likely to leave shelter to forage and are thus easier to capture by hand. The number of lobsters caught in southern California reached an estimated peak of 12,000 in 2002, after which the number of lobsters decreased to approximately 8,000 in 2005. By 2007, the estimated number of lobsters caught by recreational divers was 10,000 (California Marine Life Protection Act Initiative 2009). In the early 1990s, diving for fish and/or lobster occurred at a rate of about 1,000 trips per month, season permitting, although that number may be higher now (Neilson 2011). The average number of divers varies according to season, weather, and sea conditions (NMFS 1991).

3.13.2 CEQA Thresholds of Significance

The primary focus of this impact analysis is the socioeconomic effect to commercial fisheries, kelp harvesting, and recreational fishing/diving from a NEPA perspective. There would be no substantial difference in effect based on season of construction because this analysis considers the larger, regional fishery and its long-term health. Potential impacts are considered over time with no particular start date. As stated in Section 3.13.1, NEPA requires consideration of "economic" and "social" effects (40 CFR Section 1508.8) but CEQA only requires evaluation of population, housing, social, and/or economic effects such that they may result in physical impacts, or an evaluation as to whether economic and/or social effects may determine the significance of physical changes. No housing would be constructed with this project and no increase in population is anticipated, so there is no applicable CEQA analysis. Furthermore, economic and social effects would not create physical impacts on the environment, and the significance of environmental effects is not influenced by economic and social effects. Growth inducement is discussed in Section 6.2. NEPA does not require explicit definition of significance criteria. Issues related to environmental justice are discussed in Section 3.13.6 of this report.

3.13.3 ENVIRONMENTAL CONSEQUENCES

Overall, the social and economic effects of the action would be beneficial. The lagoon represents a valuable coastal wetland with substantial biological and ecological resources. It provides habitat for sensitive plants and wildlife, including nursery habitat, as well as over 7 miles of recreational trails within the reserve. The potential reuse of material would provide beaches with wider and larger sand areas, and beaches with exposed cobblestones would be covered with sand. Expansive sandy beaches provide greater recreational opportunities and opportunity for public access, and enhance tourism in the region. Public property and infrastructure would have additional protection from wave action and storm events while sand remains at the reuse/placement locations.

Lagoon Restoration

Alternative 2A

Temporary

It is assumed that the design and construction work associated with the lagoon restoration would be by civilian firms that would largely draw their employees from a labor pool within San Diego County. However, dredge personnel may come from outside the region since many specialized dredgers are based on the east coast. Given the temporary nature of the construction, no increase in population would occur from workers relocating to the area, and no increase in demand for local housing is anticipated to occur. Most of the construction work would be performed by workers residing within commuting distance of the lagoon, such that the demand for temporary construction worker housing would be minimal.

During construction, localized, temporary socioeconomic impacts could potentially accrue due to the proximity of sensitive receptors (such as residential areas) to the limits of lagoon restoration construction. These localized socioeconomic impacts may include changes to community character and could result from construction noise, a temporary degradation of air quality, or a decrease in traffic LOS and/or accessibility to socially important land uses. Temporary impacts to employment and local economy would be slight, but beneficial, and the overall temporary impacts to employment, income, population, and housing would be less than significant.

Permanent

With regard to permanent impacts, the lagoon restoration would not result in a permanent population increase or change in housing demand. Economic output as a result of lagoon restoration is anticipated to be beneficial, although slight, as community members and visitors would have a new opportunity to witness and enjoy a more dynamic and diverse lagoon ecosystem. Therefore, impacts on existing regional population and associated housing, employment rates, and regional economy would largely remain unchanged as a result of the lagoon restoration and would be less than significant.

Alternative 1B

While the details of design and construction activities would be slightly different from Alternative 2A, the impacts of Alternative 1B on existing regional population and associated housing, employment rates, and regional economy would largely remain unchanged and would be less than significant.

Alternative 1A

While the details of design and construction activities would be slightly different from Alternative 2A, the impacts of Alternative 1A on existing regional population and associated housing, employment rates, and regional economy would largely remain unchanged and would be less than significant.

No Project/No Federal Action Alternative

No adverse impacts would occur to local socioeconomics as a result of the No Project/No Federal Action Alternative. However, the No Project/No Federal Action Alternative would not provide an economic benefit and the lagoon would remain in its current state. Recreational opportunities and tourism value would not experience a beneficial impact, and no impact would result.

Materials Disposal/Reuse

Previous interactions with commercial fishermen and their representatives during the 2001 and 2012 RBSPs have suggested that beach replenishment and offshore materials removal/disposal may result in impacts to three areas of stakeholder concern. These concerns focus on the potential for loss of resources and income and can be summarized as follows:

- Sand placed on the beaches could move from the beaches onto sensitive habitat areas, causing immediate loss of commercial resources associated with these habitats (e.g., lobster, crab, urchin), effectively excluding this area from fishing for some period of time, otherwise known as creating a “preclusion area.” Additionally, turbidity plumes from the project would cause commercial resources to move from the area for some period of time, effectively causing area preclusion.

- Movement of sand from the beaches onto sensitive subtidal habitat areas could adversely affect nursery habitat, causing significant long-term damage (through population reduction) to the fishery.
- Materials transport and placement operations could lead to loss of fishing gear and equipment as well as limit access to fishing areas.

These three concerns (area preclusion, adverse effects to nursery habitat, and gear loss/limit access) are each discussed below. All concerns are applicable to materials placement activities in the offshore for stockpiling, nearshore at Cardiff, and onshore on-beach in the event barges are used. Materials disposal/reuse on-site would not affect commercial fisheries. Turbidity and nearshore habitat loss concerns are less applicable to the offshore disposal at LA-5 for the materials placement option under Alternative 1A. Likewise, gear conflicts and access concerns are less applicable to onshore on-beach materials disposal/reuse depending on the use, frequency, and route of materials barges.

Alternative 2A

<u>Commercial Fishing Resources/Area Preclusion</u>

Materials disposal/reuse activities would be similar to those assessed for the 2012 RBSP, although less expansive in geographic scope with respect to individual onshore beach disposal sites and would include fewer offshore sites. Based on the analysis in the 2012 RBSP EIR/EA, the level of economic activity associated with the commercial fishery in San Diego County, and the various scenarios described in Chapter 2, significant regional or localized impact is unlikely in the San Diego area or the North County subarea fisheries. Impacts may be felt at the individual fishing operation level as a result of displacement from favored fishing locations; however, the individual operational level impacts cannot be accurately quantified with the currently available data.

Though the materials disposal/reuse process would extend for approximately 10 months, only a small area of the 60-mile coastline would be affected at any one time. That is, with (possibly) two tugboats and four barges, with up to 2,500 cy of sand on each barge, operational for the project, the actual area that would be affected at any point in time would be localized and not preclude other areas from being fished. Additionally, as described in Section 2.10, SELC is committed to coordinating barge operations with USCG so that, via timely notification, areas can be fished the maximum amount of time and only the area of active dredging would be restricted

(PDF-59).Thus, **no significant long-term or substantial adverse preclusion impacts would occur as a result of the dredging operations.**

Direct impacts from materials placement would not cause significant impacts to the lobster, urchin, squid, sheephead, or halibut fisheries. Turbidity and siltation from offshore disposal would be localized and short term (Sections 3.2 Hydrology and 3.4 Water and Aquatic Sediment Quality). The area that would be affected by turbidity and siltation represents a very low percentage of available habitat, and direct placement activity at any one location would be limited to offshore SO-5/SO-6 and nearshore Cardiff. After stockpiling, offshore sites may remain at slightly different elevations from surrounding areas but would be gradually sloped and are not expected to affect lobster movement or distribution. Therefore, while increases in turbidity and siltation from disposal at the offshore stockpile sites and/or nearshore Cardiff would occur in the short term, no long-term significant impacts are expected to commercial species. Localized decreases in visibility due to turbidity from disposal or from the beaches could affect diving conditions. This effect would be localized and of limited duration, and would not be significant to the urchin fishery. Turbidity and siltation from disposal may affect squid spawning sites, but these impacts would be localized and short term, and would affect only a small percentage of available spawning areas along the coast. No long-term significant impacts are expected to the commercial squid fishery. Redistribution of sand from the beaches could temporarily cover some low-lying reef areas, causing some short-term loss of potential sheephead habitat. However, sheephead are highly mobile and the amount of low-lying reef that would be affected is small and the loss temporary. Therefore**, although some temporary impacts to low-lying reefs may occur, this effect to sheephead would be considered less than significant and not substantially adverse.**

California halibut utilize the nearshore area and lagoons as feeding and nursery areas. The proposed project could potentially affect this species. The project has been designed to avoid significant long-term impacts to the coastal lagoons (in fact, it is meant to improve the lagoon ecosystem) so no impacts to the lagoon nursery areas are expected. Some areas of the nearshore may be temporarily covered by sand moving off the beaches onto the subtidal area. This is not significant to halibut as their habitat is the sand bottom and they are well adapted to changes in nearshore sand levels. Any dislocation of halibut due to turbidity or sand movement would be localized and temporary, and is considered less than significant. **The impacts of Alternative 2A to commercial fishing resources and effects to area preclusion are considered less than significant and not substantially adverse.**

Gear Loss

Vessel traffic and barge operations have the potential to conflict with traps. To reduce the potential for trap loss and conflict, and to minimize impacts associated with the incompatibility of materials placement and fishing activities, a 300-foot buffer would be designated around the lane designated for barges to use to reach the designated disposal/reuse areas. Global Positioning System (GPS) tracking would be employed to track disposal activity (PDF-62). In the event that gear is damaged or destroyed inside of the identified 300-foot buffer, compensation would be the responsibility of the contractor. As described in Section 2.10, SELC has committed to coordination with USCG and the dredge operator to minimize, to the extent possible, gear conflict and disruption of fishing locations (PDF-59). **Potential impacts of Alternative 2A on commercial fishing gear would be minimized by these processes, and would, therefore, be less than significant and not substantially adverse.**

Nursery Habitat

Disposal activities have been designed to minimize effects on kelp and kelp habitat. Disposal at offshore sites would cause localized turbidity and siltation. However, the placement sites have been designed to provide a minimum 500-foot buffer zone from kelp beds and potential kelp habitat (PDF-55). This buffer zone is judged to be sufficient as the distances from the disposal sites would generally be much greater than 500 feet from these resources; the duration of turbidity would be intermittent and reach potential resources for a few days at most. Therefore, the impact is considered less than significant. **Turbidity from the beach sites and subsequent redistribution of the beach sand to the nearshore is anticipated to be less than significant and not substantially adverse.**

Impacts to the recreational fishing and diving include potential loss of resources, exclusion from fishing/diving areas, and decreased visibility for divers due to turbidity plumes. Sport diving for lobster and fishing for halibut in the nearshore area could be affected by the project as sand moves off of the disposal sites. Turbidity from the beaches and presence of disposal machinery would preclude use of small areas for short periods but adjacent areas would remain available for use. In the longer term, access for shore diving and surf fishing may improve with the placement of sand on the beaches. Sport fishing boats could be affected by disposal operations and turbidity plumes from the beaches. Some loss of sport fishing areas would occur during actual disposal operations but this area would be substantially less than the available nearshore areas for sport fishing and short term in nature at individual disposal locations. **Potential direct and indirect impacts of Alternative 2A on nursery habitat, kelp beds, turbidity, and recreational fishing would be less than significant and no substantial adverse impacts would occur.**

Alternative 1B

Impacts under Alternative 1B would be similar to those described for the proposed project. Due to the decrease in the volume of materials for disposal/reuse, there would be fewer trips required, less sand movement, fewer turbidity issues, and a possible shorter timeframe for these activities, making impacts of Alternative 1B altogether less, albeit slightly. **Impacts of Alternative 1B on commercial fishing resources and effects to area preclusion are considered less than significant. No substantial adverse impacts would occur.**

Alternative 1A

Impacts under Alternative 1A, would be similar to those described for the proposed project. However, concerns regarding turbidity, habitat loss, and nursery habitat loss with regard to nearshore/onshore activities would not occur. Although gear conflict concerns surrounding offshore disposal would remain, there are poor fishing conditions surrounding LA-5 as disclosed earlier in this document, and **impacts to commercial fishing would be less than significant. No substantial adverse impacts would occur.**

No Project/No Federal Action Alternative

No adverse impacts would occur to commercial fishing resources and area preclusion, gear loss, and nursery habitat as a result of the No Project/No Federal Action Alternative, and **no impact would result.**

3.13.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

A number of features have been incorporated into the project to avoid and/or minimize impacts to commercial fisheries and recreational uses during materials placement. These features include establishing buffers around sensitive resources and active construction access areas, as well as coordination with USCG to minimize conflicts during ocean-based activities. No unavoidable adverse effects or significant impacts on socioeconomics would occur as a result of implementation of any of the alternatives during lagoon restoration and/or materials disposal/reuse; no mitigation measures are required.

3.13.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA: Effects of the proposed project on socioeconomics would be largely beneficial in terms of employment and economic output; no impacts are anticipated to population or housing. In addition, there would be no long-term significant impacts to commercial fisheries.

NEPA: The proposed project would not have a substantial adverse impact on socioeconomics. Issues related to environmental justice are discussed in Section 3.13.6 of this report.

3.13.6 Environmental Justice Analysis

Protection of Children from Environmental Health Risks and Safety Risks

On April 21, 1997, President Clinton signed Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (62 *Federal Register* 19885 (1997)). The policy of the executive order states that:

> A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risks and safety risks. These risks arise because: children's neurological, immunological, digestive, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weights than adults; children's size and weight may diminish their protection from standard safety features; and children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves. Therefore, to the extent permitted by law and appropriate, and consistent with the agency's mission, each Federal agency:
>
> (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and
>
> (b) ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

To assess the potential for impacts to disproportionately accrue to children, it is important to document those land uses surrounding the lagoon and disposal sites that are likely to contain a higher proportion of children throughout the course of a day. For the purposes of this analysis, children are considered those individuals who are under 18 years of age and the sensitive land uses identified include schools, parks, and daycare centers within 0.5 mile from the proposed project sites. It is considered that health and safety risks to children, if they were to occur as part of the restoration and disposal activities, would occur within these buffer zones.

Table 3.13-7 presents the child-focused land uses near the proposed lagoon and disposal/reuse sites for all alternatives and scenarios. Existing land use maps were used to identify these land uses. Schools and parks are relatively well documented on such maps. Daycare centers vary in

Table 3.13-7
Schools, Parks, and Daycare Centers within 0.5 Mile of San Elijo Lagoon and Materials Placement Sites Study Areas

Geography		Schools	Parks	Daycare Centers
San Elijo Lagoon Study Area		The Rhoades School Solana Vista Elementary Skyline Elementary Earl Warren Middle School Sanderling School AGVI Academy for Gifted Children	Cardiff State Beach Tide Beach Park Glenn Park San Elijo State Beach Solana State Beach	Solana Beach Child Development Center Encinitas Country Day School – Temple Solel
Materials Disposal Sites	Cardiff		Glenn Park Solana State Beach Tide Beach Park	
	Moonlight	Montessori Children's house Head Start Center Oasis Community (Organic) School Paul Ecke-Central Elementary School	Stonesteps Beach Access Orpheus Park Cottonwood Creek Park Oakcrest Park East Sea Cliff County Park Encinitas Viewpoint Park Swamis Seaside and Beach Parks H, I, and J Street Viewpoints D Street Beach Access Mildred Macpherson Park Leucadia Beach Moonlight Parcels Leucadia Roadside Park	
	Solana Beach	Hanna Fenichel Center Fusion Academy	Fletcher Cove Park North Bluff Preserve Cardiff State Beach North Seascape Surf Beach Park Dog Beach Del Mar	Solana Beach Child Development Center
	Leucadia	Leucadia Children's School Peterson Montessori Intelligent Choice Educational Center	Beacon's Beach Leucadia Oaks Park Grandview Beach Leucadia Roadside Park	Lovechild Center
	Torrey Pines		Torrey Pines State Reserve	

Source: Google Earth 2012

size and can include in-home daycare providers, stand-alone institutional centers, or larger centers associated with another facility such as a church or larger school. Larger facilities or those associated with other facilities are typically more commonly documented on land use maps. Smaller facilities may not be included in mapping, but these are not necessarily dedicated child-focused land uses and are more similar in nature to residences than schools with respect to the number of children present on-site.

Areas of construction and disposal/reuse would be restricted during project implementation for safety reasons and no long-term health and safety effects would occur after the onshore disposal areas were reopened for public use. Under NEPA, to which Executive Order 13045 applies, no short-term, substantially adverse noise impacts during construction are likely to extend into neighborhoods off-site, There is no evidence that children are likely to be subject to disproportionate impacts through learning disruption or subject to health and safety effects. In summary, under NEPA, no disproportionate impacts to environmental health risks and/or safety risks to children are likely to occur with project implementation.

Environmental Justice

This section summarizes potential human health, economic, and social impacts from sand replenishment with respect to issues of environmental justice, as mandated by Executive Order 12898. The “Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” issued on February 11, 1994, requires that the relative impacts of federal actions on minority populations (including Native American tribes) and low-income populations be addressed to avoid the placement of a disproportionate share of adverse impacts of these actions on these groups. On April 21, 1995, the Secretary of Defense submitted a formal environmental justice strategy and implementation plan to EPA.

To comply with Executive Order 12898, this EIR/EIS process included gathering demographic and income information from the U.S. Census Bureau to identify areas of low-income and/or high minority populations in the areas contiguous with the lagoon and disposal/reuse sites that would potentially be exposed to impacts, as well as geographically dispersed populations that may be affected by impacts to resources within the study area. Impacts to these areas and resources were then evaluated with regard for disproportionate impacts to low-income and minority populations.

As discussed in Section 3.13.1, only one census tract (173.04), located in Solana Beach, has a percentage of minority residents that suggests that it may be a community of concern with regard to proximal and disproportionate human health, economic, and social impacts. (Upon closer analysis, only block group 2 [173.04.02] within this census tract has a percentage of minority residents over 50.0 percent. Block group 2 includes the area bounded by Stevens Avenue, Via de la Valle, I-5, and Lomas Santa Fe Drive.) Native American stakeholders and tribal members may be disproportionately affected by impacts to cultural resources.

Environmental Consequences

Overall, the human health, economic, and social impacts associated with the project would be beneficial. Under NEPA (to which Executive Order 12898 applies), some temporary substantial adverse impacts would occur during construction activities, and a permanent substantially adverse visual impact would occur (Alternative 2A). The following sections recapitulate the impacts with a human health, economic, or social nexus that would remain substantially adverse after mitigation, as well as an evaluation as to whether the impact would accrue disproportionately to environmental justice populations.

Lagoon Restoration

<u>Alternative 2A</u>

Temporary

As stated in Section 3.9.3, visitors at the San Elijo/Kilkenny vista point, users of the trail system within San Elijo Lagoon, and visitors to the Nature Center would experience a strong visual contrast during construction because of the overall change and likely perceived degradation in visual character. Since these visitors would have higher scenic expectations, the contrast would be strong as a result of construction activities. Overall, the construction phase would represent a temporary, but significant change in the visual quality and character of the lagoon for key viewers. The temporary impact to trail users and vista point viewers would be substantial and adverse.

As stated in Section 3.9.3, construction of the new inlet and CBFs on either side would be highly visible and a contrast to the current beach character. The CBFs would consist of two relatively short and low rock features along the outer reach of the tidal inlet channel. While efforts would be made to soften the appearance via naturalized finish and partial to full burial of the feature (depending on the season), the CBFs would introduce a man-made linear feature perpendicular to Coast Highway 101 extending several feet toward the ocean and the contrast would be strong for some beach users. Construction of the new inlet and CBFs would result in substantial and adverse impact.

With regard to impacts to visual resources, the users associated with adversely affected key views are not predominately minority and/or low-income populations. The affected vista point, trails, and Nature Center attract visitors from throughout the region and impacts would not disproportionately accrue to environmental justice populations who may visit. Furthermore, demographic analysis suggests that nearby populations to these key views are not environmental justice populations. Visual impacts associated with constructing and establishing the inlet and CBFs would accrue similarly, as the beach draws visitors from throughout the region and nearby populations are not considered environmental justice communities; substantial and adverse visual impacts would not accrue disproportionately to environmental justice populations.

As stated in Section 3.10.3, the road along Coast Highway 101 across the mouth of the lagoon would be demolished and replaced with the proposed bridge in two parts. Traffic analyses suggest that the daily segment operations on the roadways affected by the bridge lane closure would continue to operate at acceptable LOS C or better with the following exceptions:

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

The degradation of these two roadway segments would exceed the allowable thresholds during bridge construction activities and would be considered a temporary substantially adverse impact.

With regard to traffic impacts, Coast Highway 101 is a transportation corridor used by regional residents and a degradation of LOS along this corridor would affect all regional users equally, regardless of race, ethnicity, or income. Furthermore, nearby residents along this transportation corridor are not considered environmental justice populations based on demographic analysis. The portion of Lomas Santa Fe Drive between Solana Hills Drive and I-5 that would experience a degradation in LOS is in proximity to census tract 173.04 (as well as its block group 2, which represents a more specific geography for the identified minority community in Solana Beach). This transportation corridor is likely used by the nearby environmental justice community as residents travel to/from their homes. However, this portion of Lomas Santa Fe Drive is also likely used by non-environmental justice communities north of the corridor, as well as regional users traveling along Lomas Santa Fe Drive who may be visiting Fletcher Cove or other portions of Solana Beach. Impacts occurring along Lomas Santa Fe Drive would accrue to nearby environmental justice populations, but this accrual would not be disproportionate; an environmental justice impact would not occur.

Permanent

As stated in Section 3.9.3 and above, the establishment of a new inlet and CBFs on either side would be highly visible and a contrast to the current beach character. The new inlet and CBFs would result in a substantial and adverse impact.

Visual impacts associated with the permanent CBFs would accrue similarly, as the beach draws visitors from throughout the region and nearby populations are not considered environmental justice communities; substantial and adverse visual impacts would not accrue disproportionately to environmental justice populations.

<u>Alternative 1B</u>

Temporary

Similar to Alternative 2A, visual impacts would be substantial and adverse for trail users and vista point users due to the multi-year duration of construction. However, the affected vista point, trails, and Nature Center attract visitors from throughout the region and impacts would not disproportionately accrue to environmental justice populations who may visit. Furthermore, demographic analysis suggests that nearby populations to these key views are not environmental justice populations.

LOS degradation of two roadway segments would exceed the allowable thresholds during bridge retrofit activities and would be considered a temporary substantially adverse impact. However, Coast Highway 101 is a transportation corridor used by regional residents and a degradation of LOS along this corridor would affect all regional users equally, regardless of race, ethnicity, or income. Furthermore, nearby residents along this transportation corridor are not considered environmental justice populations based on demographic analysis.

Permanent

The details of design would be slightly different from Alternative 2A and no permanent, adverse human health, safety, or social impacts would remain after mitigation.

Alternative 1A

Temporary

LOS degradation of two roadway segments would exceed the allowable thresholds during bridge retrofit activities and would be considered a temporary substantially adverse impact. However, Coast Highway 101 is a transportation corridor used by regional residents and a degradation of LOS along this corridor would affect all regional users equally, regardless of race, ethnicity, or income. Furthermore, nearby residents along this transportation corridor are not considered environmental justice populations based on demographic analysis.

Permanent

The details of design would be slightly different from Alternative 2A and no permanent, adverse human health, safety, or social impacts would remain after mitigation.

No Project/No Federal Action Alternative

No adverse impacts would occur to human health, safety, or social values as a result of the No Project/No Federal Action Alternative.

Materials Disposal/Reuse

Alternative 2A

Temporary

No temporary adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values during materials disposal/reuse associated with Alternative 2A. Thus, no temporary substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 2A.

Permanent

No permanent adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values as a result of materials disposal/reuse associated with Alternative 2A. Thus, no permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 2A.

Alternative 1B

No temporary or permanent adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values as a result of materials disposal/reuse associated with Alternative 1B. Thus, no temporary or permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 1B.

Alternative 1A

No temporary or permanent adverse impacts would remain substantial and unavoidable with regard to human health, safety, or social values as a result of materials disposal/reuse associated with Alternative 1A. Thus, no temporary or permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of Alternative 1A.

No Project/No Federal Action Alternative

No adverse impacts would occur to human health, safety, or social values as a result of the No Project/No Federal Action Alternative. Thus, no temporary or permanent substantial adverse environmental justice impacts related to materials disposal reuse would occur due to implementation of the No Project/No Federal Action Alternative.

Avoidance, Minimization, and Mitigation Measures

No substantial adverse impacts would accrue disproportionately to environmental justice communities; no mitigation measures are required.

Level of Impact after Mitigation

NEPA: The proposed project would not have an adverse impact on environmental justice.

3.14 PUBLIC SERVICES AND UTILITIES

This section summarizes the public services and utilities in the project study area, including San Elijo Lagoon and proposed materials placement sites identified for potential materials disposal/reuse. Public utilities and infrastructure can include wastewater and sewer outfalls/access/structures, solid waste disposal sites, natural gas lines, electrical transmission lines, and utility poles. Public services that could be potentially impacted by the project include lifeguard operations at local beaches. This restoration project does not increase the demand for public services or utilities, so this analysis focuses on the potential for disruption of service and infrastructure. Information for this section was compiled, summarized, and incorporated from project field surveys and service provider information as referenced in the text.

3.14.1 AFFECTED ENVIRONMENT

A variety of utility infrastructure traverses the project study area. Multiple service providers, jurisdictions, and agencies own and maintain these utilities, such as the cities of Encinitas and Solana Beach and San Diego Gas & Electric (SDG&E). This existing utility infrastructure is described below.

The public service at issue is lifeguard service and associated facilities, such as lifeguard towers, at the local beaches proposed for materials placement. Other public services, such as libraries, schools, and other similar services would not be affected by the proposed project and are not discussed further.

San Elijo Lagoon Study Area

Sewer

The San Elijo Water Reclamation Facility (SEWRF) is located just north of the project study area near the central basin and west of I-5. The SEWRF is a publicly owned wastewater treatment plant and water recycling facility that handles mostly domestic waste and is permitted to discharge up to 2.48 million gallons per day of tertiary treated wastewater, and up to 5.25 million gallons per day of secondary treated wastewater to the Pacific Ocean through the San Elijo Ocean Outfall. The San Elijo Ocean Outfall is a 30- to 48-inch-diameter reinforced concrete pipe, which extends from the SEWRF to 1.5 miles offshore for the purpose of discharging treated wastewater (SEJPA 2013). The San Elijo Ocean Outfall passes through the northern corner of the central and west basins of San Elijo Lagoon from Manchester Avenue and exits to the ocean just south of the mouth of the lagoon.

Various other sewer lines are located within the project study area. A 12-inch-diameter Solana Beach force main sewer line runs north-south between the SEWRF toward an abandoned treatment plant and the existing Solana Beach Pump Station. The sewer main is buried at a depth of approximately 45 feet below the lagoon surface. The Solana Beach Pump Station is located within the southern portion of the project study area where the west and central basins meet. Sewer lines and associated manholes are located along the northern border of the project study area in Manchester Avenue. Sewer manholes are also concentrated along the north side of the western border of the west basin and along the I-5 ROW. Additionally, a sewer line (and associated manholes) bisects the northern corner of the east basin. Sewer infrastructure is also associated with the north end of the Coast Highway 101 bridge and ROW within the project study area. The former sewage pond in the central basin is no longer owned or operated by a service provider.

Water

Water mains are located north of the project area, generally along Manchester Avenue and its associated ROW. Water mains are also located along the northern portion of the Coast Highway 101 bridge within the project study area. No other substantial water infrastructure is located within the lagoon basins.

Electricity

SDG&E provides electrical service to the San Diego region, including the project study area. Electrical transmission corridors traverse San Elijo Lagoon in the central and east basins. In the central basin, a 69-kilovolt (kV) overhead electrical line runs parallel to the railroad ROW, passing north and south throughout the length of the lagoon. Another 69-kV overhead electrical line traverses the lagoon in the east basin, forming an L-shape configuration south of Manchester Avenue. This line connects with another transmission corridor in the far eastern portion of the basin.

Natural Gas

SDG&E is the natural gas service provider for most of the San Diego region, including the project study area. Two underground gas lines run through the project study area; one in the central basin and the other in the northeast corner of the east basin. A 12-inch-diameter natural gas line travels north-south through the central basin, immediately east of the railroad tracks. Valves associated with this line are located immediately outside of the project study area to both the north and south. Another natural gas line traverses north/south near the very eastern boundary of the project study area in the east basin. No restoration activities are anticipated to take place near the gas line in the east basin so this gas line is not discussed further.

Solid Waste

In the areas surrounding the project study area, the City of Encinitas has an exclusive franchise agreement with EDCO Waste and Recycling Services to provide solid waste collection services for both residential and commercial customers. The City of Solana Beach contracts solid waste services to two companies, Coast Waste Management Inc. and EDCO Waste and Recycling Inc., which provide service to residential and commercial accounts, respectively (Solana Beach 2013). There are no active or closed solid waste disposal sites within the project study area.

Lifeguard Services

Lifeguard services are not provided within the Reserve area as swimming, wading, diving, fishing, watercraft, and other water-based recreation are not permitted within lagoon waters. The new inlet would pass through Cardiff Beach where lifeguard services are provided. State Lifeguard Tower No. 6 is located south of the existing San Elijo lagoon mouth and is pulled into the adjacent parking lot during the winter season. Lifeguard Tower No. 5 is located farther to the north with a viewing platform of approximately 15 feet high and is not moved seasonally.

Materials Disposal/Reuse Study Area

Public utility infrastructure is not typically located within the onshore sandy or rocky beach areas as the location is too volatile. The public structures associated with the materials placement beach locations are lifeguard towers. The offshore and nearshore materials placement locations are located on the ocean floor where public utilities or structures do not exist, with the exception of an ocean outfall. Each materials disposal/reuse site is briefly described below. The information presented below is referenced from the 2012 RBSP EIR/EA.

Cardiff

The 30-inch-diameter San Elijo Ocean Outfall is buried just south of the mouth of San Elijo Lagoon. The outfall is buried within the middle portion of the proposed onshore Cardiff materials placement site.

Immediately north of the materials placement site is commercial development known as Restaurant Row, which is located next to the beach, and a lifeguard access ramp that extends to the beach. State Lifeguard Tower No. 6, which is located south of the existing San Elijo lagoon mouth, is pulled into the adjacent parking lot during the winter season. Lifeguard Tower No. 5 is located south of the development at the north end of the placement site. This tower is not moved seasonally, and its viewing platform is approximately 15 feet high.

Leucadia

The main access point to Leucadia, which is also known as Beacon's Beach, is located at the end of Leucadia Boulevard. A lifeguard tower is placed at Beacon's Beach every summer. The bluffs behind Beacon's Beach are known to be unstable with potential for landslides without seawalls providing protection. Numerous seawalls have been built between Grandview and Beacon's (including both permitted and unpermitted structures).

Moonlight Beach

One 36-inch-diameter, one 60-inch-diameter, and three 48-inch-diameter storm drain pipes are located at the end of B Street at Moonlight Beach. The City of Encinitas has excavated several feet around the outlets to expose the pipes and allow proper drainage flow.

A permanent lifeguard stand is located at the south end of Moonlight Beach at C Street and a temporary tower is placed at the north end of the beach at B Street. Both are situated on the berm above the low tide beach, and neither tower is moved during the winter season. Multiple concrete and wooden staircases provide public access from the top of the bluff to the beach.

Solana Beach

A 60-inch-diameter energy dissipater storm drainpipe is located at the west end of Plaza Street immediately adjacent to the Fletcher Cove access ramp. Another substantially smaller storm drain outlet is located at Seascape Surf, south of Fletcher Cove. This storm drain emerges from the bluff face at approximately 9 to 10 feet above msl. None of the drain pipes are directly on the beach.

Four temporary lifeguard towers are located near this materials placement site: one at Fletcher Cove, a Junior Lifeguard tower at 350 S. Sierra Avenue, one at the base of the Seascape Surf access point, and one at 825 S. Sierra Avenue. All of the towers are annually placed on the beach the weekend before Memorial Day and removed the weekend after Labor Day. In the City of Solana Beach, there are eight vertical access points (four public, four private) that provide access to the beach below (City of Solana Beach 2011).

Torrey Pines

Three permanent lifeguard towers are on the Torrey Pines material placement site. State Lifeguard Tower No. 1 is the southernmost tower, located about 100 yards south of the beach access road. Towers No. 2 and No. 3 are located farther north. Riprap has been placed on the beach to protect the road. No additional structures or utilities currently exist within the shoreline area of the proposed materials placement site.

SO-5/SO-6

Sites SO-5 and SO-6 are located offshore. SO-5 does not contain public utilities or structures within its boundaries. The San Elijo Ocean Outfall passes east-west south of SO-6 at a depth of -47.9 feet mean lower low water (MLLW).

LA-5

Ocean disposal site LA-5 is located many miles offshore and does not contain public utilities or structures within its boundaries.

3.14.2 CEQA Thresholds of Significance

A significant impact related to public services and utilities would occur if implementation of the proposed project would:

A. Result in the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design the construction of which could cause significant environmental effects.

The CEQA threshold of significance for public services and utilities was derived from a combination of thresholds listed in Appendix G of the CEQA Guidelines and thresholds used in the 2012 RBSP EA/EIR (SCH #2020051063). This threshold reflects the unique and limited extent of potential impacts to public services and utilities from coastal restoration projects.

3.14.3 Environmental Consequences

This section discusses the environmental consequences, or impacts, associated with the proposed project on public services and utilities within the study area. Potential adverse, significant, or beneficial direct and indirect impacts are identified as appropriate.

Because the proposed project would generate minimal temporary increased demand for services or utilities (mostly associated with the electric dredge, if used), this analysis focuses on displacement or disruption of public utility infrastructure and public services. Various public utilities and structures traverse the lagoon and could be affected by implementation of the proposed project. Prior to final project design and engineering, a detailed utilities study would be done in coordination with utility providers to accurately locate utilities for avoidance purposes (PDF-29). The utility study would provide information for use in design and engineering to minimize impacts to utilities and service disruptions and provide for the continued stability and integrity of existing or relocated utilities and infrastructure.

Lagoon Restoration

Alternative 2A

Restoration activities within the lagoon would require the dredging, removal, and backfill of large quantities of material, approximately 1.4 mcy from the lagoon basins and tidal channels. Most utilities in the project area are generally situated in or near road ROWs, in well-defined easements, or deeply buried. For example, the recently installed Solana Beach sewer pipe (-45 feet) traverses the central basin and west basin and is located underneath the proposed sedimentation basin/overdredge pit. As such, activities occurring near this pipeline would not exceed -40 feet to ensure adequate cover is maintained (PDF-31). However, there are areas within the lagoon where restoration activities associated with Alternative 2A may disturb existing utilities. In the central basin, a 69-kV overhead electric transmission line runs parallel to the railroad. One pole along this line is situated in the middle of the proposed new inlet location. There would be no way to avoid this pole under Alternative 2A and it would need to be relocated to construct this alternative. Access to the poles north of the inlet along this line would also be hindered. In addition, restoration activities in the east basin also have the potential to disturb one power pole located along the L-shaped transmission line in the northeastern portion of the east basin. This pole is currently located in dense vegetation that would be disturbed as part of the restoration plan. It may be possible to avoid this pole as part of the project's final design, or this pole may need to be relocated. The process for relocating and/or avoiding utilities infrastructure would occur with full coordination and cooperation with SDG&E to minimize service disruption (PDF-29 and PDF-30) and meet siting requirements. The formal utilities investigation would be conducted as part of the next phase of the project, and infrastructure within the lagoon would be fully integrated into the final design and ensure ongoing structural integrity of the infrastructure. Potential utility relocation is expected to be within the identified disturbance area of the project with the possible exception of the SDG&E utility pole as described above. If the subsequent utility study indicates the SDG&E pole would need to be relocated outside of the disturbance footprint, the pole relocation would be designed to avoid significant environmental impacts at that time and in accordance with applicable SDG&E siting policies. The proposed temporary flooding to facilitate construction activities would not interfere with or impact public utilities or infrastructure as no aboveground infrastructure would be within flooding limits and those flooding limits are below historic flooding levels.

Under Alternative 2A, changes would also be necessary to Coast Highway 101 and a bridge would be constructed over the new inlet. Activities associated with bridge construction would be typical of general construction projects. Alterations to public utility infrastructure associated with the Coast Highway 101 bridge construction would be avoided to the greatest extent possible; if necessary, utility replacement would generally be an in-kind replacement or reinstallation. Construction activities could require a nominal amount of water or wastewater disposal, but not of the magnitude that would affect the service providers' ability to supply adequate service or exceed the capacity of existing facilities, especially given the temporary nature of the demand. Construction debris would be generated during Coast Highway 101 roadway removal and bridge construction. This material would be recycled/reused as appropriate or require disposal. The construction contractor would work with local landfill facilities to locate the most appropriate location for materials disposal. The closest landfill to the project site is the West Miramar landfill located in the City of San Diego, which has adequate capacity until the year 2022 (City of San Diego 2013). Additionally, some vegetation spoils and CDFW dike material would likely need to be hauled off-site for disposal at a local landfill. This volume of material would not be of the magnitude to substantially affect landfill capacity and would be coordinated by the contractor. Other than the construction of the new bridge for Alternative 2A, minor adjustments in existing service infrastructure in the dredging areas are incorporated as part of the project with project design features required to minimize and avoid utility disruption (PDFs-23 through 25). For these reasons, **implementation of the SELRP would not require the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design and no substantial adverse direct or indirect effects would result. Impacts would be less than significant (Criterion A).**

If electrical dredging is used, facilities for electrical power would be provided in the form of a small temporary on-site electrical power substation. If necessary, the temporary electrical power site would be located north of the proposed nesting area and next to staging area #5 (see Figure 2-15). The electrical power substation would connect into existing poles and transmission lines adjacent to railroad tracks and would not require permanent new transmission infrastructure. The power substation would contain outlets for electrical dredge equipment hook-up. A temporary pole may be necessary between the existing transmission lines to feed the power site. Electrical substation equipment would be contained within an enclosed metal structure, approximately 10 feet by 10 feet wide and 8 feet high. The small enclosure could be painted or fenced. The electrical equipment and enclosure would be removed at completion of construction. The impacts from construction of the enclosure would be minor, but have been analyzed in other portions of this document as appropriate (such as Section 3.9 Visual Resources).

The power demand from use of electrical dredge equipment from local electrical sources would not be sufficient to impact the provision of electrical service in the area. The demand would occur during dredging activities (periodically between fall 2015 and summer 2016) and would not require new or additional electrical delivery infrastructure beyond that proposed as part of the project. Long-term maintenance and adaptive management would also include maintenance dredging of the inlet, subtidal/sedimentation basin, and channels. The nature of these construction activities would not require substantial use of public utilities, such as natural gas, sewer, water, etc. Restoration activities would not result in the development of the types of facilities that would require the use of, connection to, or increased demand on public utilities creating the need for new systems, supply, or infrastructure that could result in environmental effects. There would be no need for substantial alterations to infrastructure, service would not be required from a facility that has insufficient capacity, nor would the project cause an exceedance of available capacity. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Alternative 1B

As with Alternative 2A, restoration activities within the lagoon for Alternative 1B would require the dredging, removal, and backfill of large quantities of material, approximately 1.2 mcy from the lagoon basins and tidal channels. The nature of these construction activities would not require substantial use of public utilities and would not result in the development of the types of facilities that could result in the need for new systems, supply, or infrastructure. The electrical power substation, as described in Alternative 2A, would also be necessary for Alternative 1B, and would be removed after electrical dredging operations were complete. Additionally, because the location of utility infrastructure in the project study area would be fully determined through a utilities study prior to final design and engineering, the dredging and materials removal processes would be designed and completed to avoid or relocate existing utilities as needed. No modification of utilities in or adjacent to Coast Highway 101 would be needed because a new bridge/inlet would not be constructed. For these reasons, Alternative 1B would not result in the temporary or permanent need for new utility systems, substantial alterations to public service systems that could result in environmental effects, or exceedance of available capacity. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Small amounts of construction debris could be generated during some lagoon restoration activities, such as vegetation spoils and material from the CDFW dike. Similar to Alternative 2A, the construction contractor would work with County landfill facilities to identify the most appropriate location for materials disposal. Thus, Alternative 1B would not result in service requirements from a facility that has insufficient capacity or cause a temporary or permanent exceedance of available capacity. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Alternative 1A

Restoration activities within the lagoon for Alternative 1A would require the dredging and removal of material, approximately 160,000 cy from the lagoon basins and tidal channels. Similar to Alternative 2A, the nature of these construction activities would not require substantial use of public utilities and would not result in the development of the types of facilities that could result in the need for new systems, supply, or infrastructure. The electrical power site, as described in Alternative 2A, would also be necessary for Alternative 1A and would be removed after electrical dredging operations were completed. Additionally, because the location of utility infrastructure in the project study area would be fully determined through a utilities study prior to final design and engineering, the dredging and materials removal processes would be designed and completed to avoid existing utilities and would involve coordination with local utility companies. For these reasons, Alternative 1A would not result in the temporary or permanent need for new utility systems or substantial alterations to public service systems that could result in environmental effects. **No substantial adverse direct or indirect effects would result and impacts would be less than significant (Criterion A).**

Small amounts of construction debris could be generated during some activities, such as vegetation spoils and material from the CDFW dike. The construction contractor would work with landfill operators to identify the most appropriate location for materials disposal.

No Project/No Federal Action Alternative

No dredging or excavation would occur under the No Project/No Federal Action Alternative. As stated in Chapter 2, it can be assumed that there would be a continuation of the current mechanical excavation, which occurs when funding allows, maintaining an open lagoon inlet. The No Project/No Federal Action Alternative involves no new development that could result in the need for increased or altered public utility systems. No construction debris would be generated. Thus, there would be no temporary or permanent impacts to utilities or public services or need for new systems, substantial alterations to public service systems that could result in environmental effects, or exceedance of available capacity. **No substantial adverse impacts would result and impacts would be less than significant (Criterion A).**

Materials Disposal/Reuse

As noted in Section 3.14.1, Affected Environment, the materials disposal/reuse sites are located offshore, nearshore, or onshore where the public services/utilities of concern are the buried ocean outfall (near SO-6) and lifeguard towers/public stairs/drains at various onshore sites. If placement in the nearshore off Cardiff occurs, the project would place more cover on the outfall. This placement would not affect the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design, and it would be a benefit. Therefore, this issue is not discussed further. Thus, the focus of this analysis is the potential impact to existing facilities at various onshore sites, which applies to Alternative 2A and Alternative 1B; Alternative 1A is not discussed further.

The onshore beach placement of material, as proposed under Alternative 2A and Alternative 1B, would be similar to sand placement and beach building strategies utilized for the 2012 RBSP. Thus, much of the information and analysis presented in the 2012 RBSP EIR/EA (SANDAG 2011) are incorporated into the discussion and analysis of onshore beach materials placement for the proposed project.

Alternative 2A

Materials placement on the surface of proposed onshore beach locations would be completed via a pipeline from a barge or directly from the lagoon. Where lifeguard towers or access stairways are located, the sand placement would not impede the ability to use or access these facilities. As shown most recently by the 2012 RBSP, sand cover generally provides additional temporary stabilization and protection for structures from storm surges or erosion. Sight lines from the viewing platforms of the lifeguard towers would be maintained, and there would be no interference with views for the lifeguards (PDF-65). Drainage sand placement around storm drain outlets would be placed to allow continuation of proper drainage (PDF-54).

With the above project design features, the transport and placement of material to onshore locations would not result in the need for new systems or substantial alterations to existing systems due to exceedance of available capacity or an incompatibility with the project design. Thus, **public service and utilities impact would be less than significant and would not result in substantial direct or indirect adverse effects (Criterion A).**

Alternative 1B

As described for Alternative 2A, materials placement on proposed onshore beach locations would be completed via a pipeline and would occur on the surface of the sites. Where lifeguard towers or access stairways are located, the sand placement would not impede the ability to use or access these facilities and would typically provide additional temporary stabilization and protection with no interference to lifeguard line-of-sight views. Drainage sand placement around storm drain outlets would be designed to allow proper drainage. **Alternative 1B would not cause substantial direct or indirect adverse effects and a less than significant impact to public services and utilities would result (Criterion A).**

No Project/No Federal Action Alternative

No materials disposal or reuse would occur; thus, onshore placement sites would not have the temporary benefit of additional temporary stabilization and protection for the structures from storm surges or erosion. **No substantial adverse impacts would result and impacts would be less than significant (Criterion A).**

3.14.4 Avoidance, Minimization, and Mitigation Measures

No significant or substantial adverse impacts to public utilities or structures are anticipated due to lagoon restoration or materials disposal/reuse as substantial use of public utilities or services would not be required and infrastructure would be relocated or avoided. Project design features incorporating a detailed utilities study and coordination with existing utility providers avoid and/or minimize impacts to utilities. Additional features incorporated into the project would minimize impacts to services by maintaining sight lines from lifeguard towers and appropriate drainage at storm drain outlets during materials placement. No mitigation measures are required.

3.14.5 Level of Impact after Mitigation

CEQA: No significant impacts to public utilities or structures were identified and mitigation measures are not required. Impacts would be less than significant.

NEPA: No substantial direct or indirect adverse impacts to public utilities or structures were identified.

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3.15 HAZARDOUS MATERIALS AND PUBLIC SAFETY

This section addresses hazardous materials and public safety impacts associated with implementation of the SELRP. Flooding and flood hazards are discussed in Section 3.2 Hydrology. Sediment and chemical composition of dredged material are discussed in Section 3.4 Water and Aquatic Sediment Quality; however, this section does discuss these issues in terms of the potential exposure of contaminants to people and the environment. The baseline conditions described in this section are derived from the following technical studies: SAP (M&N 2013, Appendix A) and the Geotechnical Data Report (Appendix M). Specific vector-related information is provided by the Clarification Narrative for Vector Habitat Remediation Program (SELC 2012).

3.15.1 AFFECTED ENVIRONMENT

San Elijo Lagoon Study Area

Hazardous Materials and Public Safety

The San Elijo Lagoon study area is not listed as a hazardous materials site on State of California Hazardous Waste and Substances lists compiled pursuant to Government Code Section 65962.5, and there are no known sites located in the immediate vicinity of the project area (DTSC 2013). However, the lagoon is at the terminus of the Escondido Creek watershed, which encompasses approximately 84 square miles and largely consists of a mixture of developed uses, agriculture, rural housing, open space, and vacant land (SELC 2005). Runoff from the watershed into the lagoon can contain contaminants that can settle into sediments as well, particularly those associated with agricultural and household use, including fertilizers and cleaning agents.

In addition, San Elijo Lagoon has historically been subjected to a number of different activities that could have resulted in contaminated soils within the lagoon, including the discharge of treated sewage into the lagoon's former settling ponds located in the western portion of the central basin, a practice that occurred from 1940 to 1973 (SELC 2013). Currently, treated sewage passes through the lagoon via an underground pipeline maintained by the San Elijo Joint Powers Authority (refer to Section 3.14 Public Services and Utilities for a complete discussion related to utilities within the lagoon).

Hazardous materials used on-site or introduced to the site from other locations can lead to contaminated sediments within the lagoon, which may be a concern as soil disturbance and export are proposed. The SAP (Appendix A) prepared for the project characterized all proposed dredge sediments within the lagoon. However, the report emphasized chemical and physical results from the overdredge pit, as proposed in Alternative 2A and Alternative 1B, as these materials represent the beneficial reuse component of the project. Chemical analysis of materials in the overdredge pit area found the upper layer to contain some detectable levels of DDD, DDE, and DDT. The northern portion of the overdredge pit was also found to contain some detectable levels of polychlorinated biphenyls (PCBs). Re-sampling of this area found no detectable levels of PCBs; thus, the initially reported levels were determined to be a result of lab error. As detailed in the SAP (Appendix A), based on initial and follow-up correspondence with EPA and the Corps (Webb 2012), these results were not at levels high enough to trigger a concern for the on-site placement of dredged wetland sediments within the overdredge pit or beneficial reuse of sandy sediment extracted from the overdredge pit. To date, the proposed disposal/reuse areas have not been approved by the Corps or EPA; however, a SAP was prepared for the SELRP (Appendix A). Both the Corps and EPA determined that the testing in the SAP is consistent with the ITM testing procedures, which address lagoon-dredged material-placement options such as nearshore and onshore placement, direct lagoon placement, or offshore stockpiling at borrow sites within the 3-mile limit from the shore. Additional Tier 3 testing would confirm the material is suitable and is in compliance with the U.S. Ocean Dumping Regulations prior to EPA and Corps approval of any offshore disposal.

San Elijo Lagoon is an actively used recreational amenity for the public in San Diego's north county, as described in Section 3.1 Land Use/Recreation. Public use is concentrated on the Reserve's hiking trails, near the Nature Center, and west of the Reserve on Cardiff State Beach. The lagoon's trail system is surrounded by private lands, and public access to the lagoon is limited to daylight hours. No direct trail access is available to and from the lagoon to the beach. The beach area north and south of the inlet attracts sunbathers, swimmers, surfers, and other beach enthusiasts.

Vectors

The term "vector" is used to denote a carrier of disease organisms. The vector may be purely mechanical (houseflies spreading enteric organisms), or biological, wherein the disease organism multiplies or undergoes change within the vector (the development of encephalitic viruses in mosquitoes). San Elijo Lagoon has long been a mosquito breeding site. As tidal circulation within the lagoon became more restricted over the past several decades, the east basin area became dominated by freshwater cattails resulting in breeding habitat for mosquitoes.

The lagoon has multiple species of mosquitoes, including *Culex tarsalis,* which is a known vector for encephalitis and West Nile Virus. This mosquito is predominant in the summer months and thrives in freshwater and brackish water seasonal marsh areas. Other species include black salt marsh mosquito (*Aedes taeniorhynchus*) and tule mosquito (*Culex erythrothorax*).

Both the banded foul water mosquito (*Culex stigmatosoma*) and southern California malaria mosquito (*Anopheles hermsi*) have also been documented in San Elijo Lagoon (SELC 2012).

There are a number of receptors sensitive to vector-borne diseases in the vicinity of the lagoon, such as people at beach facilities; people recreating at the lagoon; people at schools, child care centers, and residences surrounding water body. The Nature Center within the Reserve hosted over 18,800 visitors in 2011 and the SELC Education Program provided outdoor programs to students and teachers from various parts of San Diego County over that same period (SELC 2012). Without comprehensive steps to limit their exposure to vector-borne disease, the over 20,000 beneficiaries of these important recreational and education programs, including many residing outside San Diego County, would be at risk.

The conditions that tend to favor mosquitoes are stagnant, fresh or brackish water with minimal circulation, narrow channels or a limited circulation system, and dense vegetation. Key management strategies to control vector populations in water bodies focus on breaking the larval life cycle before they mature and become adult mosquitoes. Strategies focus on increasing water circulation and wave action, varying water levels, decreasing vegetation such as cattails, decreasing nutrients and reducing water temperatures, and providing improved access for natural predators of larval and adult mosquitoes (aquatic and airborne) to potential breeding areas. Aerial larvicide treatments can also become more effective if channels are extended through dense vegetation that may otherwise prevent the larvicide from reaching the water surface. Common natural predators of aquatic mosquito larvae include *Gambusia* ("mosquito fish"), native killifish and stickleback, other small native and nonnative fish species, and the aquatic nymph stages of dragonflies and damselflies (*Odonata*). Predators of adult mosquitoes include frogs, bats, swallows, purple martins, and many other insectivorous bird species.

The east basin of the lagoon is the area of primary concern for mosquitoes. This basin is characterized by static water levels for long periods of time (i.e., no tidal flushing), promoting mosquito egg oviposition and larval and pupal survival and development. As a result, substantial adult mosquito populations may be generated every 7 to 10 days. Accumulation of warm anaerobic, organically rich waters attract certain standing-water mosquitoes, such as *Culex* spp. In contrast, flowing water maintains higher oxygen levels, which contributes to reducing toxic metabolites. Both of these factors enhance the survival of aquatic predators of mosquito larvae (SELC 2012).

Prior to residential developments along the southern border of the Reserve, County of San Diego personnel conducted controlled burns in the east basin to eliminate cattails and other emergent vegetation that might provide refuge to mosquito populations. Newspaper articles as early as 1987 described the need to drain stagnant water from the lagoon to reduce mosquito breeding habitat. In 2003, San Diego County Vector Control Program (SDCVCP) first applied a biological-based granular mosquito larvicide by helicopter in the east basin of San Elijo Lagoon. The SDCVCP has been regularly applying aerial larvicide at San Elijo Lagoon since 2004 (SELC 2012) as well as conducting site specific treatments at “flare-up” areas with high production of adult mosquitoes. The product used currently is a combination of Bacillus thuringiensis israelensis (Bti) and Bacillus sphaericus (Bs) fused to a corn cob granule. It is considered harmless to humans, fish, and other wildlife.

Wildland Fire Hazards

The California Department of Forestry and Fire Protection (CAL FIRE) has identified the southern and eastern portions within and immediately surrounding the project study area as very high fire hazard severity zones (CAL FIRE 2009). Specifically, CAL FIRE mapping identifies the southern side of the Reserve bordering Solana Beach’s northern city limits and the eastern area toward the community of Rancho Santa Fe in the unincorporated area of San Diego County. The vegetation in this area of the lagoon is dense and consists of woody, coastal sage scrub, maritime chaparral, south slope chaparral, and scrub/oak/chaparral mix with shrub sizes ranging from 5 to 15 feet in height (County DPR 2009). Wildland fire safety concerns have been raised due to the presence of native and exotic vegetation in the project area and within proximity to residences. Public safety issues and concerns were raised again after the 2007 Witch Creek fire, which began in Ramona and extended south and east into the community of Rancho Santa Fe.

County DPR, SELC, and the City of Solana Beach Fire Department developed the *San Elijo Lagoon Ecological Reserve Vegetation Management Plan* to address risks associated with fire to lives and property in the Solana Beach neighborhoods adjacent to the project area and to protect the public’s interest in the Reserve (County DPR 2009). The Vegetation Management Plan provides a comprehensive plan for locations where wildland interface exists in the Reserve and guides the removal of exotic vegetation and thinning of native vegetation in select areas to help reduce risks. The Vegetation Management Plan sets methods for vegetation thinning activities and also discusses erosion control, as well as the methods for removal of invasive exotic plant species.

Materials Disposal/Reuse Study Area

The materials disposal/reuse project component would place suitable dredged materials from the lagoon within the coastal environment either offshore, nearshore, or onshore the beach. These areas, by nature, are not susceptible to hazards related to vectors or wildland fires. As noted, chemical analysis of upper level material identifies some low levels of DDD, DDE, and DDT, but concentrations are not high enough to trigger a public health concern and there would be no risks introducing hazardous materials into the environment (Webb 2012). However, materials from the uppermost layers of the lagoon that contain these low levels of contaminants are generally not suitable for reuse due to their relatively fine grain size. For this reason, these materials would be placed in the overdredge pit in the central basin. (Alternative 2A and Alternative 1B) or at LA-5 (Alternative 1A). Other dredged material appears to be chemically compatible for the beneficial reuse options being considered (i.e., onshore, nearshore, or offshore staging) (M&N 2013). Therefore, this discussion focuses on recreational safety and vessel safety.

Recreational Safety

A primary concern specifically associated with placement of material on a beach or in the ocean is ensuring public safety during construction. Recreational safety is provided by lifeguard services. The California Department of Parks and Recreation provides lifeguards at the state beaches, and the cities of Encinitas and Solana Beach provide lifeguards at beaches within their jurisdiction. Bluff erosion remains a public safety concern, especially along the Encinitas and Solana Beach shoreline areas. Several fatalities and injuries due to bluff collapse have occurred within and adjacent to the Encinitas and Solana Beach materials placement sites (Corps 2012).

Water pollution stemming from storm drain outlets and from the outlets of coastal lagoons has resulted in posting at and/or occasional closing of beaches to protect public recreational safety. Bacteria indicators are monitored at storm drain outlets and adjacent surfzone and in the surfzone offshore coastal lagoons. With few exceptions, bacteria concentrations measured in the surfzone up- and down-current of the storm drain outlets have been within state standards for water-contact recreation.

Scarps (or escarpments) develop naturally along beach profiles and vary in height due to substantial changes in the beach profile (i.e., drastic drop in elevation). Scarp height is a function of the breaking wave height and the elevation of the existing beach berm. Large scarps may result in safety hazards due to substantial changes in the beach profile (i.e., drastic drop in elevation).

Vessel Safety

During materials placement, vessel safety is a concern as operations may include a variety of ocean-based barges, monobouys, and discharge pipelines traversing waters used by ocean-going vessels. Commercial boats, fishing boats, and recreational vessels currently traverse the overall project area along the San Diego region’s coast. Most vessels operate out of Oceanside Harbor, Mission Bay, and San Diego Bay.

3.15.2 CEQA THRESHOLDS OF SIGNIFICANCE

A significant impact related to hazardous materials would occur if implementation of the proposed project would:

A. Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;

B. Substantially increase public safety hazards for people surfing, swimming, walking, or otherwise recreating in and around the lagoon and the beach areas;

C. Create a substantial public health hazard from management or disposal of dredged/excavated material;

D. Substantially increase human exposure to vectors, such as mosquitoes, that are capable of transmitting significant public health diseases or creating nuisances (threshold considered for lagoon restoration only); or

E. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (threshold considered for lagoon restoration only).

The hazardous materials and public safety CEQA thresholds were derived from a combination of sources, including Appendix G of the CEQA Guidelines and County guidelines for determining significance for vectors, wildland fire and fire protection, and hazardous materials and existing contamination. Thresholds such as B and C were specifically developed in consideration of specialized or unique conditions requiring attention due to the nature of the project or the location within the lagoon and nearby beach areas.

3.15.3 ENVIRONMENTAL CONSEQUENCES

Lagoon Restoration

Alternative 2A

Hazardous Materials and Public Safety

No known hazardous materials sites are located within the lagoon or the lands immediately adjacent the project study area. Restoration activities would include dredging of materials within the lagoon. Sediment quality investigations have been conducted on materials to be dredged, and it was determined that some areas within the uppermost layer contain some harmful chemicals (i.e., DDD, DDE, and DDT). As detailed in the SAP (Appendix A), based on initial and follow-up correspondence with EPA (Webb 2012) and the Corps, the levels of contaminants found in the marsh sediments (silts and clays) material were low enough not to trigger a concern for the on-site placement proposed (bottom of the overdredge pit and capped with remaining wetland soils dredged during construction). Chemistry of the material planned for beneficial reuse is appropriate and not considered a health concern issue. Consideration of health concerns were based on comparison of the detected contaminant levels with California Human Health Screening Levels (CHHSLs) as developed by the California EPA and Office of Environmental Health Hazard Assessment and detailed in the SAP (Appendix A) (M&N 2013). CHHSLs are concentration levels of chemicals that California EPA has determined to be below thresholds of concern for risks to human health (California EPA 2005). However, the material from these uppermost layers of the lagoon, which contain low levels of contaminants, is generally not suitable for reuse due to its relatively fine grain size. For this reason, these materials would be placed in the overdredge pit in the central basin. Following placement of this material, the overdredge pit would be capped by sand material dredged from the proposed inlet location, which would encapsulate the material and prevent it from being introduced into the water column or released into the environment (M&N 2013). Sediment quality investigation results are discussed in detail in Section 3.4 Water and Aquatic Sediment Quality. Storage, handling, transport, emissions, and disposal of hazardous materials would occur in full compliance with local, state, and federal laws and regulations, such as Health and Safety Code, Sections 25500–25520 (PDF-11). **Therefore, there is a less than significant impact related to hazardous materials due to location or routine transport, use, or disposal of dredged/excavated materials (Criteria A and C) and no substantial adverse effect would result.**

Construction equipment would require a number of petroleum products such as fuel, hydraulic fluids, and lubricants for effective operation. Fuel replenishment would be required daily for most of the heavy equipment. Fueling and/or maintenance activities would occur at the staging areas away from these accessible areas (PDF-33), and the contractor would be required to prepare a Spill Prevention, Control, and Countermeasure (SPCC) plan for hazardous spill containment (PDF-3). Spills would be cleaned up in accordance with permit conditions.

During construction of Alternative 2A, heavy equipment and vehicles would be present in the project study area for lagoon restoration activities, including dredging within the lagoon and construction of the new inlet and associated CBFs. Heavy equipment would also be used to construct a new bridge along Coast Highway 101 to span the new inlet location. During off working hours, heavy equipment and vehicles in areas that could be accessed by the public would be secured in a general contractor's staging area and would not pose a safety hazard

(PDF-34). Construction areas would be staked and no construction zones defined (PDF-4). As necessary, access to portions of lagoon trails and beaches would be temporarily restricted to maintain public safety (PDF-5). Ongoing maintenance activities would be subject to these same safety precautions in an effort to reduce public safety hazards associated with heavy equipment operations to people surfing, swimming, walking, or otherwise recreating in and around the lagoon. Additionally, PDF-1 would require implementation of a public information program to assist nearby residents in understanding the purpose of the project and to disseminate pertinent project information. Incorporation of these safety project design features would protect publicly accessible areas within the lagoon (i.e., trails and the existing inlet) to ensure public safety is maintained.

The temporary controlled flooding that would be necessary during dredging operations to provide adequate water levels to support the barges would not create a hazard or public safety risk. Some trail closures would be required during flooding to ensure public safety as detailed in Section 3.1 Land Use/Recreation. The temporarily flooded areas would be within current and historical areas of lagoon inundation. **Therefore, there would be a less than significant impact to public safety associated with lagoon flooding and dredging and bridge building (Criterion B) and no substantial adverse effects would result.**

Once Alternative 2A is constructed, the new inlet and associated CBFs would be a permanent project feature in the onshore and nearshore beach environment along Cardiff State Beach. The new inlet would be deeper and wider than the existing inlet. While large-scale changes to the patterns of currents are not anticipated with implementation of the new inlet, ebbing tidal currents would extend from the wetlands to the nearshore ocean in a gradually dissipating and spreading plume. This could create a hazard for beachgoers and swimmers. CBFs would extend to the msl line on the beach (and to the MLLW contour under the sand beach) and would be shoreward of the surf zone where wave breaking occurs under most conditions. Surfers and beachgoers are expected to stay away from the CBFs and the new inlet to avoid potential injury and would likely cross the channel farther seaward along the MLLW line where the inlet would become relatively shallow and wide. By themselves, the new inlet and CBFs do not pose a safety hazard. However, persons who stray too close to these areas may place themselves in situations that may result in injury should they be thrown against the CBFs, or swept into the inlet or a rip current. Limited lifeguard services are provided by the California Department of Parks and Recreation at Cardiff State Beach. The presence of lifeguards closer to the new inlet and CBFs would help reduce public safety hazards. Warning signs would also enhance public awareness to avoid potential safety hazards. Public unawareness is the greatest factor contributing to significant public safety hazards near the new tidal inlet and CBFs under Alternative 2A. **This would result in significant and substantial adverse impact to public safety associated with CBF installation (Criterion B).**

Vectors

Vector issues are an existing concern at the lagoon and are addressed routinely by SDCVCP, primarily via aerial application of granular larvicide. The potential for project impacts must be evaluated during the construction period, given phased water impoundment, and post-construction given modified habitats, channels and water areas.

During construction, multiple factors would serve to change the vector breeding conditions that currently exist throughout the lagoon. Temporary inundation of areas in the central and west basin during construction for Alternative 2A would raise the water level in impounded areas to an elevation of +5 or +6 feet NGVD (Figures 2-16 and 2-17). This elevation would be higher than existing water levels and, although impounded, water within the diked areas is not expected to result in increased vector concerns. Mosquito larvae are usually concentrated in the water surface tension zone (meniscus) where water contacts leaves and stems; raising the water level breaks up this larval harborage and prevents adult production. Water used to inundate flooded areas would be captured during high tide inflow from the ocean, increasing the overall salinity within the impounded areas. As flooding is initiated, vegetation extending out of the water would be cleared from the lagoon, removing cattails and other sheltering areas for mosquito larva. The flood water levels above vegetation, as well as areas that would be cleared, would substantially reduce the amount of aquatic vegetation available for larva protection and would allow predators, such as aquatic invertebrates, fish, birds, and dragon flies to access and feed on the larva more efficiently.

Once flooded, large portions of the lagoon would be an expanse of open water more subject to wind wave action. While in this coastal area there is a prevailing wind, it is currently blocked by dense vegetation and a lack of contiguous water. The wind-activated, moving waters would be less conducive to successful mosquito breeding. The engines and propellers of dredging equipment and support vessels moving from place to place in the impoundment areas would provide manual circulation below the water surface. The hydraulic cutterhead suction dredge would not generate substantial turbidity and would minimize nutrients from suspended sediment in the water column. This would reduce the ability of the larva to feed during the dredging period and maximize the ability of sight-feeding predators to find the larva. Overall, the lagoon would be far less conducive to mosquitoes as vegetation would be removed, water salinity increased, and wind action and channel design would increase circulation.

Outside of diked and deeply inundated areas, the lagoon would remain open to tidal action and freshwater inflow as under current conditions. Conditions in the east basin would remain generally the same during Phases 1 and 2 of construction (Figure 2-16). The existing CDFG dike would be modified to control water flowing west to east and to maintain elevation 6 feet NGVD in that central basin. In Phase 3, the dike would be located at I-5 but still functioning to keep the central basin at 6 feet NGVD. Water would be conveyed from east to west over the dike so that elevations on the east side would remain 5 feet NGVD or lower (current conditions). Thus, freshwater flows heading to the ocean would not be impounded in the east basin and water would not increase retention time in the cattails, or create new sources of mosquito breeding. By Phase 4, the dike would be removed and tidal circulation would extend east of I-5. Control measures in the east basin would continue as currently performed.

During construction there would be heavy equipment, construction vehicles, and other tools/storage facilities along the edges of the lagoon. These locations are focused on staging areas so they do not rim the entire lagoon. There is some potential for rainwater or other sources to become impounded in small containers or wheel ruts. Given the rapid mosquito life cycle, an impoundment of 7 to 10 days can allow for successful breeding. As described in Table 2-25, a biological monitor would be on-site during construction. That person would perform a variety of tasks to ensure construction remains within the ROW and complies with all design features, standard regulations, permit conditions, construction specifications, and mitigation measure. As noted in PDF-14, one responsibility will be confirmation that the contractor is satisfying construction specifications dictating no ponded water. They would also be empowered to release small containers of water to eliminate breeding conditions. A construction specification will also be applied requiring Vector Control staff to have access throughout construction for their routine monitoring and treatment activities.

After implementation, Alternative 2A would result in improved circulation throughout the lagoon, including the east basin. Channels would be widened and extended into aquatic vegetation in the central and east basins, and much of the freshwater marsh currently in the east basin would be removed. The primary change in habitat distributions under Alternative 2A would be an increase in open water areas/tidal channels (74 acres proposed) and mudflat habitat (102 acres proposed) within the lagoon compared to existing conditions (40 and 63 acres, respectively). Freshwater marsh in the lagoon, primarily monocultures of dense cattail, would be reduced by 36 acres and other marsh habitats (low-, mid-, and high-) would be reduced by 20 acres. Open water areas and tidal channels would be increased in all three lagoon basins compared to existing conditions. It is not possible to totally eliminate vectors in the lagoon because of the overall size and habitat diversity, but the restoration provided by Alternative 2A would decrease habitats good for mosquito propagation and harborage (dense expanses of freshwater and saltwater marsh) and increase unfavorable habitats for mosquitoes (open water, channels within marsh areas, tidal mudflats, regularly inundated/tidally drained areas).

The subtidal basin would be created and the main channel would be enlarged and straightened, increasing the ability of waves and ripples to be created on the water surface. In addition, enhanced tidal action under Alternative 2A would lead to a much larger area inundated at high tide, and a smaller area inundated at low tide. More open water and the dynamic hydrologic cycle of tides would interrupt the mosquito reproduction process, and would lead to substantially increased mortality of eggs, larvae, and pupae. Eggs laid on water during one point of the tide may be left totally high and dry during the subsequent low tide, or delivered directly to the ocean by tidal currents (SELC 2012). Increased tidal action under Alternative 2A would also result in other benefits for mosquito abatement, including increased salinity, which reduces the ability of these vectors to reproduce; quick draw-down, which prevents establishment of stagnant ponds on the lagoon edges; and habitat conversion with less emergent plant growth in the east basin resulting in better circulation of water, improved access for SDCVCP staff, and improved effectiveness of vector control measures.

The higher volume of cooler ocean water entering more expansive areas of the lagoon would create a poor temperature-based environment for larvae survival. Existing nutrient-rich soils currently cause the lagoon system to become eutrophic and create good breeding habitat/food for larva. Large volumes of this soil would be removed as part of Alternative 2A through shallow grading/dredging. Alternative 2A should significantly reduce the need for periodic aerial larvicide treatments during the summer months, thereby substantially reducing expenditures by SDCVCP (SELC 2012).

Implementation of Alternative 2A would result in a less-conducive vector breeding condition and reduce the public health and safety risk associated with mosquito-borne diseases. Substantial increases in human exposure to vectors are not anticipated either during construction or after implementation of Alternative 2A. For this reason, implementation of Alternative 2A would not substantially increase human exposure to vectors, such as mosquitoes, that are capable of transmitting significant public health diseases or creating nuisances and no significant or substantial adverse impacts would occur, rather **beneficial project impacts would occur (Criteria B and D).**

<u>Wildland Fire Hazards</u>

As previously discussed, the southern and eastern portions of the project study area are located adjacent to lands that have the potential to support wildland fires. Alternative 2A would result in vegetation clearing and grubbing activities within the lagoon boundaries; however, neither construction nor maintenance activities would occur within the wildland interface areas. Lagoon restoration and maintenance activities would not conflict with implementation of the Vegetation Management Plan. In addition, restoration activities would not introduce new or permanent structures within the lagoon area that would create new fire hazards. While fire hazard risks associated with construction equipment are not anticipated, a variety of project design features would be implemented by the contractor (Section 2.10). Specifically, construction equipment used in restoration and maintenance activities would have fire suppression equipment on board or at the worksite (PDF-35), heavy equipment operators would be trained in appropriate responses to accidental fires (PDF-36), and emergency communication equipment would also be available to site personnel. **Impacts associated with wildland fires would not be substantially adverse and would be less than significant (Criterion E).**

Alternative 1B

Alternative 1B would retain the existing inlet location and would not require construction of new structures on the beach or within the lagoon inlet area (i.e., CBFs). During construction, implementation of the project design features, such as an SPCC plan for hazardous spill containment (PDF-3), equipment fueling/maintenance in designated locations away from accessible areas (PDF-33), securing equipment during off-hours (PDF-34), defining and staking construction areas (PDF-4), temporarily restricting access to portions of lagoon trails and beaches (PDF-5), and implementation of a public information program (PDF-1) would help to reduce public safety hazards to people surfing, swimming, walking, or otherwise recreating in and around the lagoon mouth to less than significant. Ongoing maintenance activities would be subject to these same safety precautions. The discussion of hazardous material safety and wildland fire hazards and associated regulatory requirements and project design features for Alternative 2A are applicable to Alternative 1B. **Impacts related to hazardous materials, public safety, and wildland fires would be less than significant (Criteria A, B, C, and E) and would not be substantially adverse.**

Similar to Alternative 2A, Alternative 1B would increase tidal influence and salinity in the east basin. Channels would be widened, straightened, and extended into vegetation, allowing for wind-driven wave action and predator access to areas currently providing shelter for larval mosquito populations. Temporary flooding during construction of Alternative 1B would also result in increased wave action, circulation, and salinity, and a decrease in dense visible vegetation. Nonflooded areas would remain open to tidal action and freshwater inflow as under current conditions, or under the designed enhanced channel configuration proposed under Alternative 1B. Habitat distributions under Alternative 1B would be an increase in open water areas/tidal channels (67 acres proposed) and mudflat habitat (71 acres proposed) within the lagoon compared to existing conditions (40 and 63 acres, respectively). Most of the increase in open water/tidal channels and mudflat habitat would occur in the central and east basins. Conditions during and after construction are anticipated to be better for mosquito control than under current conditions. Implementation of Alternative 1B would facilitate the control of vectors at the lagoon and reduce the public health and safety risk associated with vector-borne diseases. Substantial increases in human exposure to vectors are not anticipated during construction or after implementation of Alternative 1B. **No significant or substantial adverse impacts would occur; rather, beneficial project impacts would occur (Criteria B and D).**

Alternative 1A

Alternative 1A would result in impacts similar to those described for Alternative 1B related to public safety and wildland fires. Alternative 1A would retain the existing inlet location and would not require construction of new structures on the beach or within the lagoon inlet area (i.e., CBFs). During construction, implementation of the project design features, such as an SPCC plan for hazardous spill containment (PDF-3), equipment fueling/maintenance in designated locations away from accessible areas (PDF-33), securing equipment during off-hours (PDF-34), defining and staking construction areas (PDF-4), temporarily restricting access to portions of lagoon trails and beaches (PDF-5), and implementation of a public information program (PDF-1) would help to reduce public safety hazards to people surfing, swimming, walking, or otherwise recreating in and around the lagoon mouth to less than significant. Intermittent maintenance activities would be subject to these same safety precautions. The discussion of hazardous material safety and wildland fire hazards and associated regulatory requirements and project design features for Alternative 2A are applicable to Alternative 1A. **Impacts related to hazardous materials, public safety, and wildland fires would be less than significant (Criteria A, B, C, and E) and would not be substantially adverse.**

Under Alternative 1A, the main feeder channel throughout the site would be enlarged and redirected just west of I-5, the main tidal channel would be extended farther into the east basin, existing constricted channel connections would be cleared and enlarged, and two new channels would be created through the CDFW dike to allow tidal and fluvial connections. The tidal prism of Alternative 1A would be slightly increased compared to existing conditions. Existing habitat areas would essentially remain intact, although some freshwater habitat areas in the east basin are anticipated to convert to more saltwater-based communities due to enhanced tidal influence and the resulting changes in inundation frequencies. Because this alternative would have the least increase to tidal flow and least change to the east basin, the benefits associated with an improved vector controlled environment would not occur, but neither would the vector control environment worsen over the existing conditions. **No significant or substantial adverse impacts related to vectors would occur (Criteria B and D).**

No Project/No Federal Action Alternative

Under the No Project/No Federal Action Alternative, impacts related to public safety and risks associated with wildland fires would remain similar to existing conditions. Impacts would be less than significant for both of these issues. However, the conditions at the lagoon associated with vectors would continue to be exacerbated without implementation of the proposed project or alternatives. Under the No Project/No Federal Action Alternative, no actions would be taken to improve the tidal circulation within the east basin and conditions would continue to accumulate stagnant waters that attract mosquitos, thereby increasing the chance for exposure of vector-borne disease in the nearby communities. While this issue is currently being addressed by the SDCVCP, no long-term plan is in place, besides the proposed project, to help reduce vector-related issues. Although **no new impacts (Criteria A through E) or substantial adverse effects would be anticipated** under the No Project/No Federal Action Alternative, conditions would remain unchanged.

Materials Disposal/Reuse

The materials disposal/reuse project component would occur within the coastal offshore, nearshore, and onshore beach environment that is not susceptible to hazards related to vectors or wildland fires. Therefore, these issues are not addressed further.

For all project alternatives, it should be noted that dredged materials have been tested and it was determined that some areas within the uppermost layer contain detectible levels of some harmful chemicals (i.e., DDD, DDE, DDT); however, as described earlier, these low levels are not substantial enough to cause a public health concern based on initial correspondence with EPA (Webb 2012). The material appears to be chemically compatible for the beneficial reuse options being considered (i.e., onshore, nearshore, or offshore staging) (M&N 2013). However, the uppermost layers of material would not be suitable for reuse based on the relative fine grain size. Under Alternative 2A and Alternative 1B, this material would be disposed of in an overdredge pit in the central basin. Following placement of this material, the overdredge pit would be capped by sand material dredged from the proposed inlet location, which would encapsulate the material and prevent it from being introduced in the water column or released into the environment (M&N 2013). For Alternative 1A, dredged material would be disposed of in LA-5. Preliminary soil investigations included in the SAP also suggest the material would be suitable for disposal at LA-5; however, a formal determination from EPA and the Corps would be required prior to disposal. Discussions in the SAP regarding offshore disposal at LA-5 occurred for background and to understand its capacity limitations, but formal submittals requesting authorization to place sand would be made upon selection of a final alternative. If disposal at LA-5 were to be part of the selected alternative, then supplemental Tier 3 analysis would be conducted. Should the materials be determined not suitable for disposal at this location, the material would be sequestered on-site in built transition or nesting areas. Sediment quality investigation results are discussed in detail in Section 3.4 Water and Aquatic Sediment Quality.

Contaminated materials are not anticipated to exist within dredge areas according to results of previous testing (M&N 2013); however, the possibility exists that other unforeseen wastes and hazardous materials could be dredged from the lagoon due to contamination from past sewage spills, potentially illegal dumping of hazardous materials, or other sources. **Therefore, under CEQA Alternative 2A, Alternative 1B, and Alternative 1A could create a public health hazard from management or disposal of dredged/excavated material and this would be a potentially significant effect (Criterion C). Because prior testing showed that there was no contamination at levels that would cause a public health hazard in the proposed dredge material, no substantial adverse effects could result per NEPA.**

Alternative 2A

<u>Vessel Safety</u>

Under Alternative 2A, materials could be placed in the offshore environment in SO-5 and/or SO-6 and/or area beaches, using a monobuoy and barges to transfer material to those sites. The primary hazard associated with offshore placement is vessel safety during the transport of materials. The potential for a vessel to collide with the barge or a support vessel would be remote as vessels would be equipped with markings and lights in accordance with established USCG regulations. The location and operational schedule of the barge would be published in the USCG "Local Notice of Mariners" to inform local boaters of the presence and location of the barge (PDF-61). The travel speed would also be slow (approximately 5 knots) during the transport of sand to placement sites. To maintain vessel safety, a 300-foot-radius buffer area would be established around the monobuoy in offshore waters (PDF-62), to allow proper anchoring and pump line operation. To ensure that no vessels would enter this restricted zone, the anchoring area would be included in the "Local Notice to Mariners." All pipelines used during offshore stockpiling efforts, including both floating and submerged, would be clearly marked as "navigational hazards" (PDF-60). There would be a short-term and localized increase in vessel traffic in the area associated with project construction with a limited distance of travel to set and remove the pipeline. Therefore, Alternative 2A would not create navigation hazards or result in unsafe conditions for vessel traffic. **Public health and safety impacts associated with offshore placement of materials under Alternative 2A would be less than significant and no substantial adverse impacts would occur (Criteria B and C).**

<u>Public/Recreational Safety</u>

None of the potential beach placement sites are included on a list of hazardous material sites. For nearshore and onshore placement sites, portions of the beach directly affected by active materials placement activities may be closed temporarily (PDF-63). Closing the area to the public would prevent potential unsafe conditions for the public associated with the presence and operation of heavy equipment used to move the sand around on the beach. Adjacent stretches of beach not directly affected by placement activities, such as those areas through which pipeline may extend but where sand is not directly being placed, would remain open to public access and recreational activities (PDF-6). Depending on the beach site and material excavation rates, up to 1,000 feet of beach may be closed per day in a specific location. As sand placement activities shift along the beach, those areas in which sand placement has been completed would be reopened to public use. Prior to opening areas of beach with placed materials, the material would be spread and checked for potential hazards (e.g., foreign objects in the sand) (PDF-67). Horizontal access along the back beach would be maintained at sites with no alternative access (e.g., where a wet beach abuts bluffs), with temporary closures occurring as necessary to complete sand placement to the back edge of the beach (PDF-70). Lifeguard services would remain during construction and mobile lifeguard towers would be temporarily relocated if necessary (PDF-64), and sand would be placed to avoid blocking line-of-sight at permanent lifeguard towers (PDF-65).

Ocean areas directly adjacent to sand transport/placement equipment and activities may also be temporarily closed to ensure public safety. Buffers around temporary monobuoys and ocean placement sites would be maintained to avoid water recreation users and vehicle safety hazards. Additionally, the safety-related project design features described above would provide necessary safety measures in the vicinity of the nearshore and onshore placement sites to ensure public safety is maintained at all times. Fueling and/or maintenance activities would occur at the staging areas away from the beach, and the contractor would be required to prepare an SPCC plan for hazardous spill containment (PDF-3).

Potential safety impacts due to increased scarp heights may occur. As a project design feature, the Marine Safety departments in the cities of Encinitas, Solana Beach, and San Diego would post signs advising the public of the presence of scarps should they develop on the beaches where sand is being placed (PDF-66). These scarps often occur naturally in the absence of beach nourishment and are usually short term and localized and would not be considered a significant effect of the project.

Onshore materials placement at Encinitas and Solana Beach could result in potential public health and safety benefits by increasing beach widths. This could increase the distance between beachgoers and dangerous bluffs, and may, in the short term, reduce the number of bluff failures affecting the public safety on the beaches.

Public health and safety impacts associated with nearshore and onshore placement of materials under Alternative 2A would not be substantially adverse and would be less than significant (Criteria A, B, and C).

Alternative 1B

Materials placement options under Alternative 1B would be very similar to those described for Alternative 2A. Alternative 1B would produce slightly less volume of dredged materials to be placed offshore, in the nearshore at Cardiff, or at onshore beach locations. This would result in similar impacts in the offshore, nearshore, and onshore placement sites, as described for Alternative 2A. **Public health and safety impacts associated with offshore, nearshore, and/or onshore placement of materials under Alternative 1B would not be substantially adverse and would be less than significant (Criteria A, B, and C).**

Alternative 1A

Under Alternative 1A, dredged materials would be disposed of offshore in LA-5 or used on-site in the nesting or transitional areas. The primary hazard associated with offshore placement is vessel safety during the transport of materials and this activity would be performed consistent with the project design features in Section 2.10, including publishing the location and operational schedule in the USCG “Local Notice of Mariners” (PDF-61) and the implementation of a 300-foot-radius buffer area around the barge lane in offshore waters to maintain vessel safety (PDF-62). **Public health and safety impacts associated with placement of materials under Alternative 1A would not be substantially adverse and would be less than significant (Criterion B and C).**

No Project/No Federal Action Alternative

No materials would be placed offshore, nearshore, or onshore under the No Project/No Federal Action Alternative. At some of the onshore placement sites, waves could continue to erode fragile bluffs. This deterioration is occurring under existing conditions. **Impacts from the No Project/No Federal Action Alternative would not be substantially adverse and would be less than significant (Criterion B and C).**

3.15.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Project design features have been incorporated throughout the project to minimize and avoid hazardous material and public safety hazards. Project design features also incorporate measures necessary to meet regulatory requirements and standards related to hazardous material safety. Project design features addressing hazardous materials and public safety include implementation of a SPCC plan for hazardous spill containment, equipment fueling/maintenance in designated locations away from accessible areas, securing equipment during off-hours, defining and staking construction areas, providing fire suppression equipment onboard or at the worksite, and training heavy equipment operators in appropriate responses to accidental fires. Vessel safety project design features include publishing the location and operational schedule of the barge in the USCG "Local Notice of Mariners", establishing a 300-foot-radius buffer area around the monobuoy in offshore waters, and marking pipeline used during materials placement on adjacent beaches and offshore stockpiling efforts as "navigational hazards." Other public safety project design features require temporarily restricting access to portions of lagoon trails and beaches, implementation of a public information program, relocating mobile lifeguard towers, and maintaining line-of-sight from all lifeguard towers. There would be no significant impact associated with vectors so no mitigation measures are warranted. Impacts from construction of a new inlet would be substantially adverse and significant. Significant impacts would also occur to public health hazards from disposal of dredged materials. Mitigation for those impacts is discussed below.

Lagoon Restoration

The following mitigation measures are needed to reduce impacts associated with construction of a new inlet under Alternative 2A:

HAZ-1 The project applicant shall continue coordination with California Department of Parks and Recreation to relocate the mobile lifeguard tower (State Lifeguard Tower No. 6) closer to the new inlet location.

HAZ-2 The project applicant shall continue coordination with California Department of Parks and Recreation to install signs at the new inlet to enhance public awareness to avoid potential safety hazards associated with the new inlet location and associated CBFs.

Materials Disposal

The following CEQA mitigation measure is needed to reduce impacts associated with public health hazards from management or disposal of dredged/excavated material under Alternative 2A, Alternative 1B, and Alternative 1A:

HAZ-3 A sediment management plan shall be developed and implemented to test dredged materials for proper placement in the overdredge pit or for off-site transport and proper disposal and to be in compliance with local, state, and federal regulations. The plan shall specify that if unknown contamination or other buried hazards are encountered during dredging, procedures must be carried out according to applicable regulations. Any material encountered that appears to contain contaminants shall be handled in accordance with local, state, and federal guidelines, and permit conditions.

3.15.5 LEVEL OF IMPACT AFTER MITIGATION

CEQA: Implementation of Mitigation Measures HAZ-1 and HAZ-2 would reduce public safety risks associated with the new inlet and CBFs under Alternative 2A to less than significant.

With implementation of HAZ-3, the potentially significant CEQA impacts would be reduced to a less than significant impact related to upset and accident conditions involving the release of hazardous materials into the environment for Alternative 2A, Alternative 1B, and Alternative 1A.

The No Project/No Federal Action Alternative would result in less than significant impacts related to hazardous materials and public safety for both lagoon restoration and materials placement project components and no mitigation measures are required. The benefits to vector control (less conducive conditions) would not be realized.

NEPA: Implementation of Mitigation Measures HAZ-1 and HAZ-2 would reduce substantial adverse public safety risks associated with the new inlet and CBFs under Alternative 2A.

Implementation of the No Project/No Federal Action Alternative would not result in substantial adverse impacts related to hazardous materials and public safety for both lagoon restoration and materials placement project components. The benefits to vector control (less conducive conditions) would not be realized.

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3.16 GLOBAL CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

A variety of studies have been conducted analyzing global climate change, the effect anthropogenic factors have on climate change, and the potential effects to the region of anticipated future climate change impacts. This section provides the Affected Environment and regulatory context that apply to the key issues that pertain to climate change for this project: greenhouse gas (GHG) emissions and sea level rise/extreme events. The GHG emissions calculations and more detailed regulatory information are provided in Appendix K. Data described in these analyses accurately reflect conditions at the time of NOP publication.

3.16.1 AFFECTED ENVIRONMENT

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place. Climate change refers to the change in long-term average weather conditions and is a global phenomenon (Gutro 2005).

Certain gases in Earth's atmosphere, classified as GHGs, play a critical role in determining Earth's surface temperature. Solar radiation enters Earth's atmosphere from space. A portion of the radiation is absorbed by Earth's surface, and a smaller portion is reflected back toward space as infrared radiation (heat). Infrared radiation is selectively absorbed by GHGs; as a result, infrared radiation released from Earth that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This is known as the "greenhouse effect" and is responsible for maintaining a habitable climate on Earth. Without the naturally occurring GHGs and the greenhouse effect, Earth would not be able to support life as we know it.

However, anthropogenic emissions of GHGs leading to atmospheric levels in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect. This has resulted in a trend of unnatural warming of Earth's atmosphere and oceans, with corresponding effects on global circulation patterns and climate (IPCC 2007). There is international scientific consensus that human-caused increases in GHGs have contributed and will continue to contribute to global climate change, although there is uncertainty concerning the magnitude and rate of the change.

ARB has identified six principal GHGs that contribute to the greenhouse effect: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These six GHGs compose the emissions to be monitored to meet the requirements of AB 32, the Global Warming Solutions Act of 2006. Likewise, EPA's endangerment finding of 2009 covers emissions of the same six GHGs. Water vapor is an important GHG but its concentration depends on temperature and other meteorological conditions; therefore, it is considered a feedback of climate change rather than a direct cause (IPCC 2007).

Carbon dioxide equivalent (CO_2e) is a measurement used to account for the fact that each type of GHG has a different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. Expressing emissions in CO_2e takes the contributions to the greenhouse effect of all GHG emissions and converts them to the equivalent effect that would occur if CO_2 were being emitted. This measurement, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere and is generally calculated over a 100-year period. The GWP of the six principle GHGs is shown in Table 3.16-1.

Table 3.16-1
Global Warming Potential of Greenhouse Gases

Greenhouse Gas	Symbol	Global Warming Potential (CO_2e)
Carbon Dioxide	CO_2	1
Methane	CH_4	21
Nitrous Oxide	N_2O	310
Hydrofluorocarbons	HFC	14–14,800
Perfluorocarbons	PFC	6,500–12,200
Sulfur Hexafluoride	SF_6	23,900

Source: IPCC 2007

The amount of CO_2 in the atmosphere in the past 150 years (the time when anthropogenic GHG emissions increased significantly) has risen from approximately 280 parts per million (ppm) to 390 ppm and is increasing at a rate of approximately 2 ppm per year (NOAA 2012). Although efforts at the international, national, state, and local levels are underway to reduce future emissions of GHGs, some level of climate change has already occurred and additional climate change is predicted for the future, although the extent of future change is uncertain. The change in GHG emissions has led to 1.3°F change in average global air temperature from 1900–2000. The Intergovernmental Panel on Climate Change (IPCC) anticipates that additional increases in atmospheric CO_2 could increase by up to 11.5°F by 2100.

Increased levels of GHGs in the atmosphere not only affect global average temperatures, but climate change models predict changes in temperature, precipitation patterns, water availability, sea levels, and extreme events, such as tsunamis. It is anticipated their impact will vary by region, and these altered conditions may have severe impacts on natural and human systems in California (CalEPA 2010). Sea levels have risen by as much as 7 inches along the California coast over the last century. The state has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year (CNRA 2009). Additional changes related to climate change can be expected by the year 2050 and on to the end of the century:

- California's mean temperature may rise 1.5°F to 5.0°F by 2050 and 3.5°F to 11°F by the end of the century.
- Average annual precipitation may show little change, but more intense wet and dry periods can be expected with more floods and more droughts.
- Flood peaks will become higher and natural spring/summer runoff will become lower.
- Global sea level projections suggest possible sea level rise of approximately 14 inches (36 centimeters) by 2050 and a high value of approximately 55 inches (140 centimeters) by 2100 (CNRA 2009).

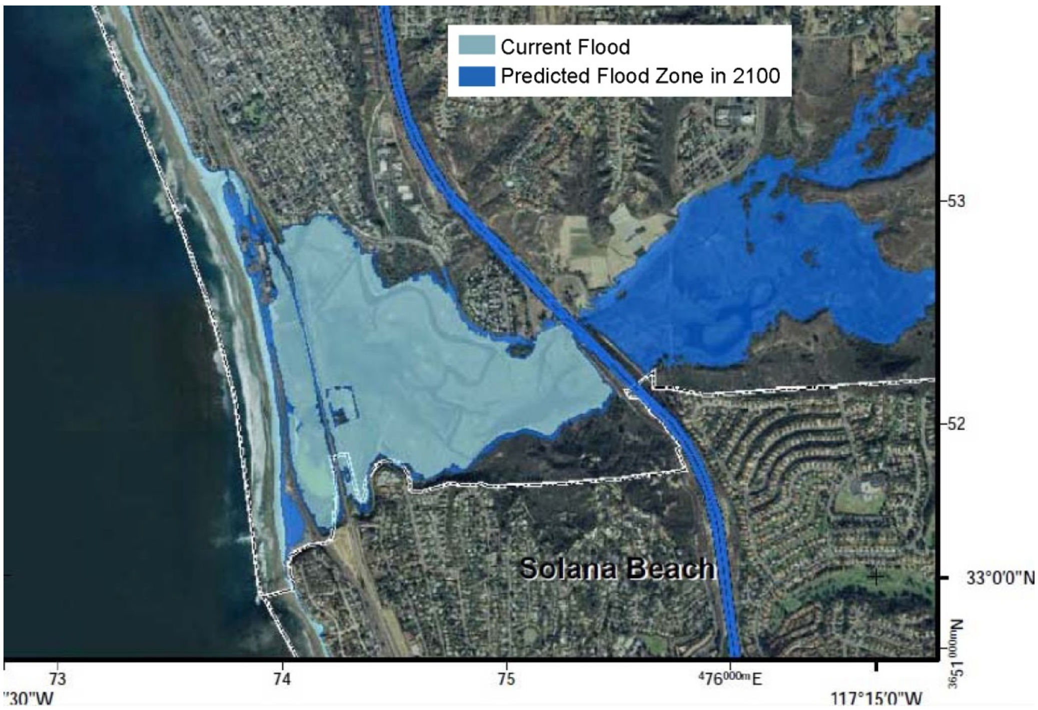
Climate models are used to predict changes in temperature, precipitation, and other effects due to climate change. In the past, models have been reliable on a global scale; more recently, confidence in regional models is increasing (IPCC 2007) and can provide a more localized evaluation of climate change impacts by downscaling global models to specific regions. Downscaling (at the 12-kilometer grid level) has been conducted for California and shows southern coastal areas are likely to experience average temperatures of 2.9 to 3.8°F (1.6 to 2.1° Centigrade) warmer and +3 percent to –24 percent annual precipitation by about 2065 (Cayan et al. 2012). California has created an interactive website called Cal-Adapt to help planners assess regional and local impacts of climate change under different scenarios (http://cal-adapt.org/).

Sea level rise will not be uniform, nor uniformly affect the state's population, infrastructure, and ecosystems. The population vulnerable to a 100-year flood along the Pacific coast in San Diego County will increase by 210 percent with a 55-inch sea level rise, from 3,000 to 9,300 residents (Heberger et al. 2009).

The Pacific Institute has developed a series of maps demonstrating areas at risk in the current 100-year flood zone and with a 55-inch sea level rise (Figure 3.16-1). The map for San Elijo lagoon is presented below; light blue indicates the current 100-year flood zone and dark blue indicates the flood zone under a sea level rise scenario of 55 inches in 2100.

Extreme events that would be exacerbated due to sea level rise include storm surge and tsunamis. As mapped by the California Emergency Management Agency, California Geological Survey, and University of Southern California, the entire coastline in the San Diego region is considered a tsunami hazard area (Department of Conservation 2009). San Elijo Lagoon is also included within this tsunami hazard area, with the tsunami inundation area encompassing the entire central and west basins, as well as the coastal area, of the project study area.

Figure 3.16-1
San Elijo Lagoon Flood Zone (Current and Predicted Sea Level Rise in 2100)



Source: http://www.pacinst.org/reports/sea_level_rise/hazmaps/Encinitas.pdf

3.16.2 CEQA Thresholds of Significance

Greenhouse Gas Emissions

The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; however, a single project would be unlikely to measurably contribute to a noticeable incremental change in the global average temperature. GHG impacts to global climate change are inherently cumulative, and projects should be evaluated through cumulative impacts, since GHG emissions from multiple projects could result in a cumulative impact with respect to global climate change. There are different CEQA and NEPA thresholds of significance for GHG emissions. The thresholds used in this analysis are described in the paragraphs below.

CEQA

ARB and SDAPCD have not established quantitative significance thresholds for evaluating GHG emissions in CEQA analyses. Appendix G of the CEQA Guidelines states that a significant impact related to global climate change and GHG emissions would occur if implementation of the proposed project would:

A. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment

B. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

The County of San Diego has established a screening threshold of 900 MT CO_2e per year as a project-level GHG screening threshold that would apply to operational and construction emissions from land use development projects (San Diego County 2015). The screening threshold of 900 MT CO_2e per year is based on the California Air Pollution Control Officers Association (CAPCOA) white paper (CAPCOA 2010). This analysis conservatively compares the annual construction and operational emissions for the proposed project and alternatives to the threshold of 900 MT CO_2e per year. The screening threshold is considered conservative because it is lower than other adopted or recommended GHG thresholds of significance across the state (e.g., 1,100 MT CO_2e/year for the Sacramento Metropolitan Air Quality Management District and 1,150 MT CO_2e/year for the San Luis Obispo County Air Pollution Control District). It is not the intent of the County to adopt any of the above-listed mass emissions limits as a numeric threshold for the proposed project; rather, this additional information is provided to put project-generated GHG emissions in the appropriate statewide context.

If the project exceeds 900 MT CO_2e per year, then the project would have a cumulatively considerable contribution to climate change impacts if it would result in a net increase of construction and operational greenhouse gas emissions, either directly or indirectly, and if the project would incorporate mitigation that achieves less than a 16 percent total reduction compared to unmitigated emissions (San Diego County 2015).

NEPA

There are no federally-applicable thresholds for the evaluation of GHG emissions. The Council on Environmental Quality (CEQ) guidance proposes 25,000 MT CO_2e per year as a useful indicator to determine whether additional analysis of climate change impacts may be required.

Therefore, the threshold of 25,000 MT CO_2e per year will be used to analyze emissions under NEPA.

Sea Level Rise and Extreme Events

Section 15126.2 of the CEQA Guidelines states that "the EIR should evaluate any potentially significant impacts of locating development in other areas susceptible to hazardous conditions (e.g., floodplains, coastlines, wildfire risk areas) as identified in authoritative hazard maps, risk assessments or in land use plans addressing such hazards areas." In March 2012, the California State Coastal Conservancy (SCC) issued a guidance document for projects funded by the SCC for assessing impacts and vulnerabilities of a project subject to sea level rise and extreme events. The SCC recommends a risk analysis approach to evaluate the ability of a project to adapt or cope with sea level rise over time, including implementation of project design features that would reduce risks. Draft sea level rise policy guidance has also been published by the CCC (CCC 2013), which emphasizes the use of soft solutions such as beach replenishment as a component of shoreline protection, and recommends habitat restoration and enhancement projects be designed to withstand impacts of sea level rise and adapt to future conditions, specifically in the development of LCPs.

On November 9, 2011, the Second District Court of Appeals held that a lead agency is not required to analyze the impact of the environment on a proposed project under CEQA (*Ballona Wetlands Land Trust et al. v. City of Los Angeles*). Even though the requirements for analyzing the impact of the environment on a project continue to be litigated, this analysis also includes an evaluation of the project's vulnerability to sea level rise and extreme events for informational purposes only. This approach is consistent with Executive Order S-13-08, which recommends consideration of sea level rise to assess project vulnerability.

3.16.3 Environmental Consequences

Greenhouse Gas Emissions

Lagoon Restoration and Material Disposal

This analysis focuses on the direct and indirect GHG emissions resulting from construction of the project and subsequent maintenance activities, including construction equipment, worker vehicle trips, waste generation, and fuel use and electricity consumption from other equipment. GHG emissions due to the proposed action would be associated with construction and ongoing maintenance. Construction-related emissions would be associated with dredging and vegetation removal equipment, construction vehicles, and employee commute trips. Construction emissions would be temporary and would cease upon completion of the proposed restoration project. Operational emissions would be associated with infrequent maintenance and would primarily involve worker vehicle trips.

Emissions from the operation of diesel-fueled off-road equipment were estimated by multiplying peak daily usage (i.e., hours per day) by equipment-specific emission factors and equipment-specific load factors consistent with the ARB's off-road mobile source emission inventory model, OFFROAD. GHG emissions from on-road motor vehicles were estimated using EMFAC2011 mobile source emission factors, which includes emission factors for vehicles in San Diego County. Worker and heavy-duty truck trips were estimated based on data provided in the Traffic Impact Analysis for San Elijo Lagoon Restoration Project (Appendix J). Electricity-related emissions were estimated using SDG&E emissions factors for 2009. Other detailed assumptions are provided in Appendix K.

Consistent with Section 3.11 Air Quality, this analysis evaluates lagoon restoration and materials disposal together. Climate change and GHG emissions are a cumulative impact and therefore emissions associated with individual project components must be evaluated together. The project may use a diesel or electric engine; therefore, emissions associated with each engine type are evaluated.

CEQA Analysis

<u>Alternative 2A</u>

Temporary

As shown in Table 3.16-2, construction emissions using a diesel dredge would total 29,177 MT CO_2e over the 36-month construction period, and the maximum emissions in a single year were estimated to be 9,480 MT CO_2e in 2017. With an electric dredge, construction emissions would total 30,266 MT CO_2e over the construction period, and the maximum emissions in a single year are estimated to be 9,813 MT CO_2e in 2017. The annual construction-related GHG emissions would exceed the screening threshold of 900 MT of CO_2e per year. **Therefore, this impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-2
Construction-Related Greenhouse Gas Emissions
for Alternative 2A

	Annual Emissions (MT CO2e)							
	2016		**2017**		**2018**		**2019**	
	Diesel	Electric	Diesel	Electric	Diesel	Electric	Diesel	Electric
Mobilization/Demobilization/ Site Preparation	251	251					173	173
Construction Equipment	2,632	2,632	4,806	4,806	4,127	4,127	2,209	2,209
Dredging	2,386	2,564	4,474	4,807	4,589	4,931	3,195	3,433
Materials Disposal	134	134	200	200				
Annual Total	**5,403**	**5,580**	**9,480**	**9,813**	**8,717**	**9,058**	**5,577**	**5,815**
Total Emissions								
Diesel								*29,177*
Electric								*30,266*

[1] Dredging may use either a diesel or electric engine; therefore, both are analyzed in this analysis. Other emissions would be equal.
Source: Modeled by AECOM 2014; for more detail see Appendix K

ARB's Scoping Plan includes measures to meet California's goal of reducing emissions to 1990 levels by 2020 and also reiterates the state's role in the long-term goal established in Executive Order S-3-05, which is to reduce GHG emissions to 80 percent below 1990 levels by 2050. According to ARB, the 2020 goal was established as an achievable, mid-term target, and the 2050 GHG emissions reduction goal represents the level scientists believe is necessary to stabilize the climate (ARB 2008).

ARB's Scoping Plan includes measures that would indirectly address GHG emissions levels associated with construction activities, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of a low carbon fuel standard (LCFS). Policies formulated under the mandate of AB 32 that are applicable to construction-related activities are assumed to be implemented during construction of the project.

The measures in the Scoping Plan also put California on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels. Implementing light-duty vehicle GHG emission standards, LCFS, regional transportation-related GHG targets, and the Renewable Portfolio Standard (RPS) as set forth in the Scoping Plan would continue to achieve reductions through at least 2030. However, the Scoping Plan does not recommend additional measures for meeting specific GHG emissions limits beyond 2020 at this time. The Scoping Plan is currently being updated, and additional information on revised measures is not available at the time this analysis was developed.

The County of San Diego does not have a "standard" list of policies or mitigation measures that would be required for construction projects with potentially significant GHG emissions impacts

(County of San Diego 2012). Therefore, the proposed project would not conflict with County of San Diego GHG policies.

Neither the County nor any other agency with jurisdiction over the proposed project has adopted climate change or GHG reduction measures with which the proposed project would conflict. Moreover, construction emissions would be temporary and would cease at the completion of construction activities. Therefore, the proposed project would not conflict with existing plans, policies, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Permanent

As noted above, maintenance activities would occur every 3 years and would include dredging, construction equipment, and worker vehicle trips. As shown in Table 3.16-3, the emissions associated with regular maintenance using a diesel-engine dredge were estimated at 3,686 MT CO_2e,. For an electric-engine dredge, regular maintenance would result in 3,856 MT CO_2e.

Table 3.16-3
Maintenance-Related Greenhouse Gas Emissions for Alternative 2A

	Maintenance Emissions (MT CO_2e)	
	Diesel	**Electric**
Construction Equipment	1,398	1,398
Dredging	2,288	2,458
Total Maintenance Emissions	**3,686**	**3,856**

[1] Dredging may use either a diesel or electric engine; therefore, both are analyzed in this analysis. Other emissions would be equal.
Source: Modeled by AECOM 2014; for more detail see Appendix K

State and federal programs would result in the reduction of GHG emissions, especially for operational emissions that would occur after the initial construction period. Existing programs for air quality improvement in California, including the Diesel Risk Reduction Plan and the 2007 SIP, would result in the accelerated phase-in of cleaner technology for virtually all of California's diesel engine fleets, including construction equipment (ARB 2008). The NHTSA fuel economy standards for medium- and heavy-duty engines will lower emissions for engines of model years 2014 and later. Measures implemented under these plans are likely to result in more GHG efficient off-road construction equipment and on-road vehicles.

If an electric engine is used for dredging, emissions associated with the use of electricity would be reduced from continued implementation of the RPS. The source of electricity (e.g., renewable energy) affects the amount of GHG emission estimates associated with the proposed project. Electricity-based emissions account for approximately 50 percent of construction emissions and 65 percent of maintenance emissions under the electric dredge scenario; therefore, depending on the pace of implementation of the RPS by SDG&E, fewer emissions may result from use of an electric dredge than reported above.

However, additional reductions associated with state and federal programs were not included in the estimates of GHG emissions. As shown in Table 3.16-3, the annual maintenance emissions would exceed the screening threshold of 900 MT CO_2e per year. **Therefore, the impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

As discussed earlier, ARB's Scoping Plan includes measures that would indirectly address GHG emissions levels associated with construction activities, including the phasing in of cleaner technology for diesel engine fleets (including construction equipment) and the development of an LCFS. Policies formulated by ARB under the mandate of AB 32 that are applicable to construction-related activities are required for projects and are therefore assumed to be implemented during maintenance and operational activities.

Neither the County nor any other agency with jurisdiction over the proposed project has adopted climate change or GHG reduction measures with which the proposed project would conflict. Therefore, the operational and maintenance activities for the proposed project would not conflict with existing plans, policies, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Alternative 1B

Temporary

As shown in Table 3.16-4, construction emissions under Alternative 1B using a diesel dredge would total 28,090 MT CO_2e over the proposed construction period, and the maximum emissions in a single year are estimated to be 9,076 MT CO_2e in 2017. Total construction emissions with an electric dredge would result in 29,178 MT CO_2e over the construction period. The annual construction GHG emissions would exceed the screening threshold of 900 MT of CO_2e per year. **Therefore, the impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-4
Construction-Related Greenhouse Gas Emissions for Alternative 1B

	Annual Emissions (MT CO2e)							
	2016		2017		2018		2019	
	Diesel	Electric	Diesel	Electric	Diesel	Electric	Diesel	Electric
Mobilization/Demobilization/ Site Preparation	251	251					173	173
Construction Equipment	2,447	2,447	4,401	4,401	3,575	3,575	2,264	2,264
Dredging	2,386	2,564	4,474	4,807	4,589	4,931	3,195	3,433
Materials Disposal	134	134	200	200				
Annual Total	**5,218**	**5,396**	**9,076**	**9,408**	**8,164**	**8,505**	**5,632**	**5,869**
Total Emissions								
Diesel								*28,090*
Electric								*29,178*

Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, construction activities associated with Alternative 1B would not conflict with ARB's Scoping Plan. Therefore, Alternative 1B would not conflict with existing policies, plans, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Permanent

Maintenance activities under Alternative 1B would occur annually and would include construction equipment and worker vehicle trips. However, Alternative 1B would not require use of a dredge. As shown in Table 3.16-5, the annual maintenance emissions would not exceed the threshold of 900 MT CO_2e per year. Therefore, **this impact would not be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-5
Maintenance-Related Greenhouse Gas Emissions for Alternative 1B

	Maintenance Emissions (MT CO_2e/yr)
Construction Equipment	106
Total Annual Emissions	**106**

Notes: MT CO_2e/yr = metric tons of carbon dioxide equivalent per year.
Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, the operational and maintenance activities associated with Alternative 1B would not conflict with ARB's Scoping Plan. Therefore, operational and maintenance activities associated with Alternative 1B would not conflict with existing policies, plans, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Alternative 1A

Temporary

As shown in Table 3.16-6, construction emissions over the 3-year period under Alternative 1A would total 9,670 MT CO_2e using a diesel dredge and 9,822 MT CO_2e with an electric dredge. The annual construction GHG emissions in would exceed the threshold of 2,500 MT of CO_2e per year. **Therefore, the impact would be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-6
Construction-Related Greenhouse Gas Emissions for Alternative 1A

	2016		**2017**		**2018**	
	Diesel	**Electric**	**Diesel**	**Electric**	**Diesel**	**Electric**
Mobilization/Demobilization/ Site Preparation	251	251	251	251	173	173
Construction Equipment	2,563	2,563	2,563	2,563	994	994
Dredging	809	869	809	869	404	434
Materials Disposal	342	342	342	342	171	171
Annual Total	**3,964**	**4,025**	**3,964**	**4,025**	**1,742**	**1,772**
Total Emissions						
Diesel						*9,670*
Electric						*9,822*

[1] Dredging may use either a diesel or electric engine; therefore, both are analyzed in this analysis. Other emissions would be equal.
Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, the construction activities associated with Alternative 1A would not conflict with ARB's Scoping Plan. Therefore, Alternative 1A would not conflict with existing policies, plans, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

Permanent

Minimal annual maintenance would occur under Alternative 1A and would include construction equipment and worker vehicle trips. Alternative 1A would not require use of a dredge. As shown in Table 3.16-7, the annual maintenance emissions would not exceed the screening threshold of 900 MT CO_2e per year. Therefore, **this impact would not be a considerable contribution to the cumulative climate change impact (Criterion A).**

Table 3.16-7
Maintenance-Related Greenhouse Gas Emissions for Alternative 1A

	Maintenance Emissions ($MT\ CO_2e/yr$)
Construction Equipment	92
Total Annual Emissions	**92**

Notes: MT CO_2e = metric tons of carbon dioxide equivalent.
Source: Modeled by AECOM 2014; for more detail see Appendix K

Similar to Alternative 2A, the operational and maintenance activities associated with Alternative 1A would not conflict with ARB's Scoping Plan. Therefore, operational and maintenance activities associated with Alternative 1A would not conflict with existing policies, plans, or regulations adopted for the purpose of reducing GHG emissions. **This impact would be less than cumulatively considerable (Criterion B).**

No Project/No Federal Action Alternative

The No Project/No Federal Action Alternative would result in continued periodic maintenance at the project site and would therefore result in continued periodic GHG emissions. Under this alternative, no dredging or excavation would occur to improve tidal circulation, channel clearing, or other comprehensive actions to improve tidal exchange or upstream flooding. The lagoon inlet would remain in its existing location. However, maintenance is intermittent and dependent on funding. The No Project/No Federal Action Alternative would result in continued vehicular and equipment activity primarily related to maintenance of the inlet opening. Since no increase in activities would occur under the No Project/No Federal Action Alternative, GHG emissions would also not increase. Due to improved emission standards, emissions would be anticipated to be lower in future years. Therefore, **this impact would not be a considerable contribution to the cumulative climate change impact and would be less than significant (Criteria A and B).**

NEPA Analysis

None of the alternatives analyzed would emit more than 25,000 MT CO_2e per year. According to CEQ guidance, no further analysis is required. Therefore, **no substantial adverse direct or indirect effects would occur.**

Sea Level Rise and Extreme Events

Lagoon Restoration

San Elijo Lagoon will be subject to climate change regardless of the alternative implemented. Vulnerabilities would be based on changes in temperature, precipitation (timing and amount), drought, storm intensity, extreme heat days, sea level rise, and storm surges. In general, increased sea level could allow high tides to reach farther into low-lying areas; flooding could persist longer and be more difficult to drain; higher water levels may cause greater erosion; and prolonged drought may affect species survival.

The regional climatic and physical characteristics subject the lagoon to many of the changes that are anticipated. The lagoon is often inundated due to the lack of a fully functional inlet. The effects of inundation would be similar to those caused by flooding or sea level rise. Extreme temperatures and drought also occur in the lagoon and while their frequency may increase due to climate change, much of the existing flora and fauna is adapted to fluctuations in their environment. The ocean would moderate extreme temperature changes to some extent. Species within the lagoon are expected to be resilient to short periods (days to weeks) of extreme heat or cold, because these species are already subjected to these periodic conditions (e.g., Santa Ana conditions) and a slight increase in frequency is unlikely to result in major biota losses.

Projected sea level rise scenarios as discussed in Section 3.16.1 and the *Sea Level Rise Analysis* prepared for the project (M&N 2010) guided the restoration planning and engineering for the proposed project. The restoration plan includes areas of higher elevation (e.g., man-made transitional areas) that are intended by design to transition from upland to wetland under sea level rise, or from a higher elevation wetland to a lower elevation. Additionally, the lagoon currently has existing areas outside of tidal influence that are anticipated to convert to tidally influenced wetland as sea level rise occurs (e.g., upland slopes surrounding lagoon and freshwater/brackish wetland areas within the east basin). As conversion occurs, habitat distribution within the lagoon would shift. Table 3.16-8 identifies predicted habitat distributions under each alternative at 2065, assuming a sea level rise of 2 feet. This predicted distribution is relatively speculative, however, as it accounts for only sea level rise, which is one of many anticipated components of climate change. Other trends, such as changes in rainfall and weather patterns, are extremely difficult to predict and are not accounted for in this prediction. Additional adaptive capacity would depend on the alternative chosen and the adaptive management plan. Ongoing maintenance activities are anticipated for each alternative and would be guided by the management plan. That management plan would address specific risks and uncertainties, including those related to climate change. The plan would include feasible adaptation strategies that can be implemented as risks are identified. This would include establishing indicator data that would be monitored regularly, such as the ordinary high water mark; and minimizing loss by allowing habitat migration or redistributing dredged sediment to raise elevations, as necessary. These adaptive management strategies would emphasize maintenance of the ecological functions and services of San Elijo Lagoon, rather than maintenance of a specific habitat distribution (e.g., acreage of each habitat type).

Table 3.16-8
Approximate Future Habitat Distribution (2065) under Sea Level Rise

Habitat Type	Alternative 2A		Alternative 1B		Alternative 1A		No Project/ No Federal Action	
	Post-Restoration	**2065**	**Post-Restoration**	**2065**	**Post-Restoration**	**2065**	**Equilibrium**	**2065**
Avian Nesting Areas	2	2	2	2	2	2	0	0
Mudflat	102	151	71	147	25	161	29	161
Low-Marsh	23	86	51	75	44	48	51	55
Mid-Marsh	124	101	98	77	140	92	107	69
High-Marsh (Tidal)	29	24	44	36	28	54	47	24
High-Marsh (Nontidal)	78	63	80	67	117	86	120	107
Salt Panne	17	2	30	2	35	3	37	5
Freshwater/Brackish Marsh	96	56	99	64	121	69	131	87
Open Water/Tidal Channels and Basins	74	83	67	94	33	44	24	48
Riparian	67	54	67	55	70	57	71	60
Coastal Strand	5	1	5	1	5	1	5	1
Upland & Others	292	300	295	301	299	304	299	304
Beach	14	14	15	15	15	15	15	15
Berms and Roads	24	23	24	23	24	23	23	23
Transitional (man-made)	12	1	12	1	2	1	0	0
Subtotal – Tidally Influenced Area[1]	**352**	**445**	**331**	**429**	**270**	**399**	**258**	**357**
Subtotal – Nontidally Influenced Area[2]	**608**	**515**	**629**	**531**	**690**	**561**	**710**	**611**
Total Acreage	**960**	**960**	**960**	**960**	**960**	**960**	**960**	**960**

[1] Tidally influenced areas include open water/tidal channels and basins, mudflat, low-marsh, mid-marsh, and high-marsh (tidal).
[2] Nontidally influenced areas include avian nesting area, high-marsh (nontidal), salt panne, freshwater/brackish marsh, riparian, coastal strand, upland and others, beach, berms and roads, and transitional (man-made).
[3] Totals may not add due to rounding.

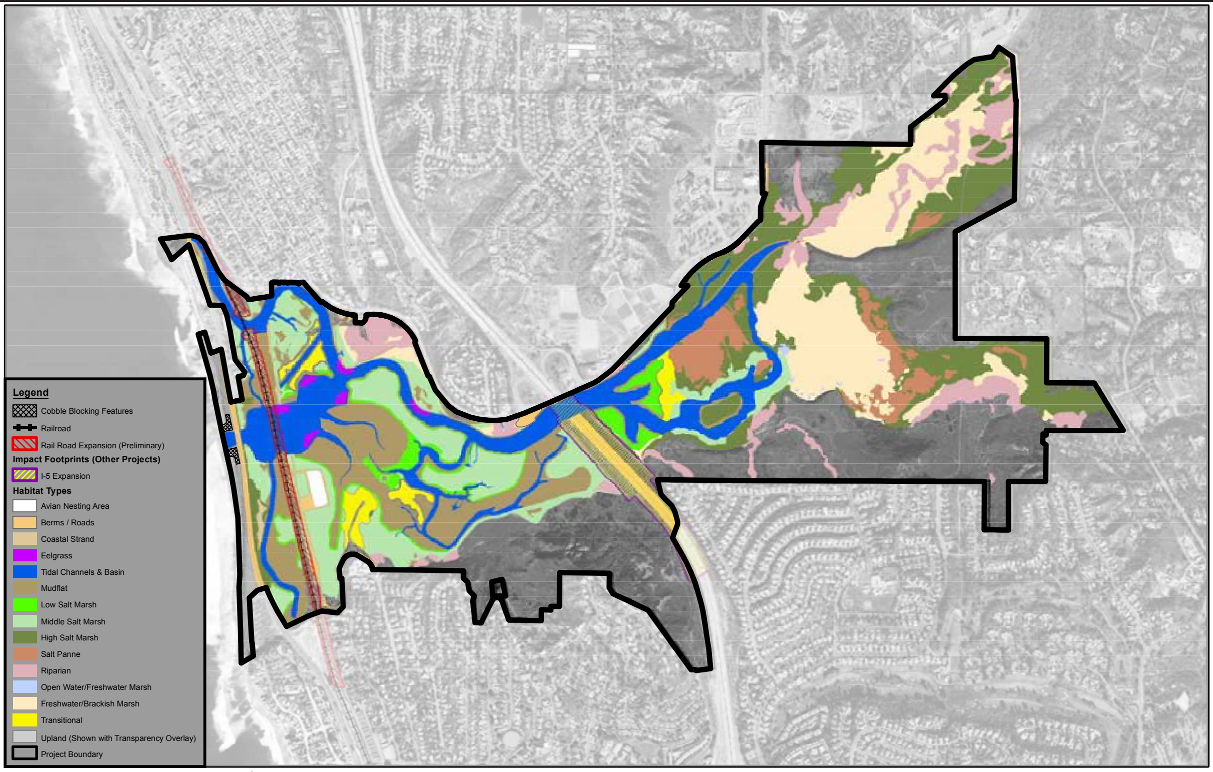
Alternative 2A

Alternative 2A would restore the tidal range within the lagoon to be more consistent with that of the ocean (Table 3.2-1) and lower the maximum 100-year flood elevation (Table 3.2-2). Using the sea level rise estimation method described in the Hydrology/Hydraulics Study (Appendix D), which adds 2 feet to the 2015 flood elevations under each alternative to estimate 2065 conditions, Alternative 2A would continue to provide flood protection under sea level rise compared to the No Project/No Federal Action Alternative. In a 2065 100-year storm, only one portion of the east basin would be expected to flood. The tidal range would increase over existing conditions and habitats would be restored to support a diverse mix of critical species. Figure 3.16-2 illustrates the generalized habitat distribution change over time (from existing conditions to 2065) with sea level rise. Generally, the balance of habitats in the east basin would shift more toward salt marsh, with anticipated decreases in freshwater and brackish marsh, as well as salt panne, as shown in Table 3.16-8. The central basin would continue to support a mix of mudflat, low-marsh, and mid-marsh, with increases in subtidal, mudflat, and low-marsh as higher elevation habitats (e.g. mid- and high-marsh, as well as transitional) decrease.

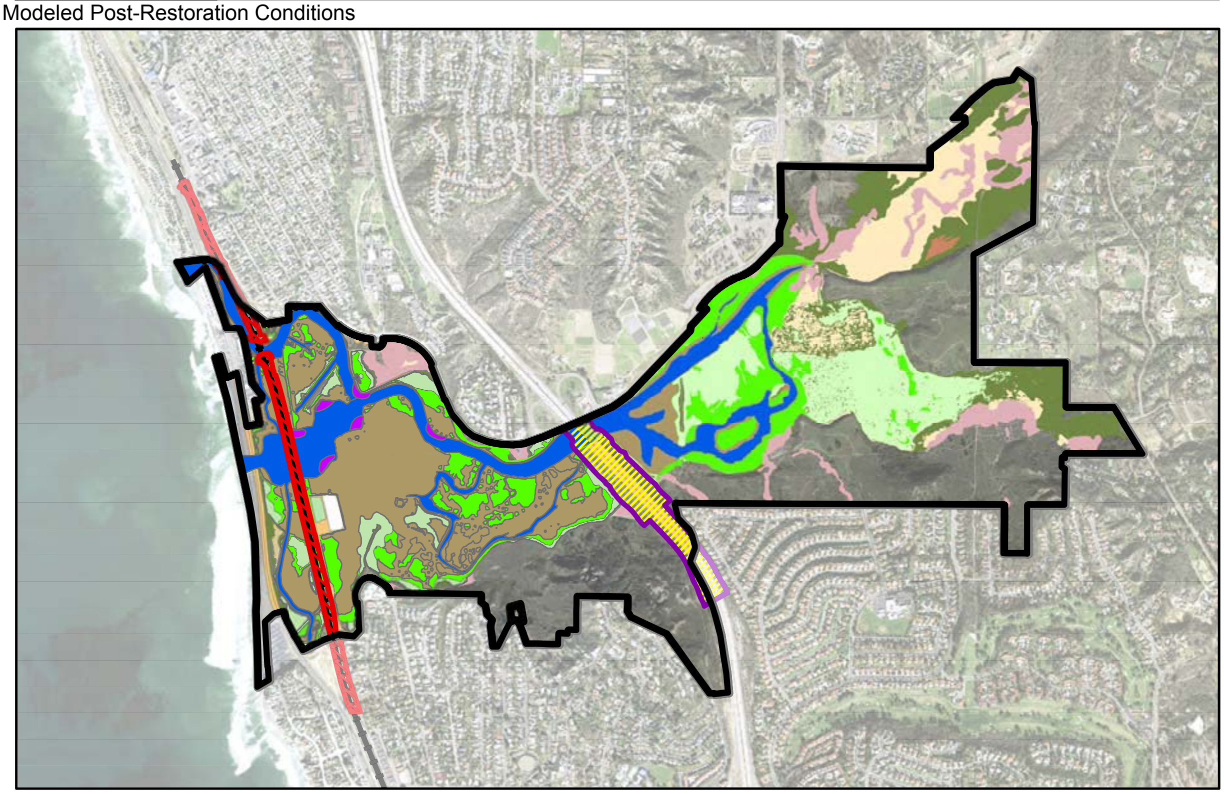
Maintaining a consistent tidal exchange with the ocean would enhance the ability of the lagoon to slowly adapt to changes in sea level over time. Lowered flood elevation would provide resiliency against floods, other extreme events, and sea level rise. Although, under extreme sea level increases, the lagoon may be inundated, Alternative 2A would include an adaptive management plan identifying strategies that could provide additional habitat by selectively redistributing sediment to maintain habitats or facilitate relocation of habitats to higher elevations. In addition, maintaining healthy wetlands protects shorelines from flood and erosion by absorbing waves and slowing the flow of the high water mark. Overall, Alternative 2A would improve the ability of the project area to respond to long-term climate impacts, such as increased sea level rise.

Alternative 1B

Similar to Alternative 2A, Alternative 1B would increase the tidal range within the lagoon and generally reduce the maximum flood elevation of the lagoon, although not to the same extent as Alternative 2A. Alternative 1B would be expected to lead to water levels up to a foot above the elevation of Manchester Avenue in a 2065 100-year storm, although anticipated extent of flooding would be much less than that anticipated under the No Project/No Federal Action Alternative. Flooding would be expected to occur in the east basin and a portion of the central basin. Figure 3.16-3 illustrates the generalized habitat distribution change over time (from existing conditions to 2065) with sea level rise. Similar to Alternative 2A, the balance of habitats in the east basin would generally shift more toward salt marsh, with anticipated decreases in freshwater and brackish marsh, as well as salt panne, as shown in Table 3.16-8. The central basin would continue to support a mix of mudflat, low-marsh, and mid-marsh, with increases in subtidal, mudflat, and low-marsh as higher elevation habitats (e.g. mid- and high-marsh, as well as transitional) decrease. Maintenance activities would occur annually, providing additional opportunity to respond to long-term climate change impacts.



Modeled Post-Restoration Conditions



Modeled 2065 Conditions

Figure 3.16-2
Alternative 2A Generalized Habitat Distribution With Sea Level Rise

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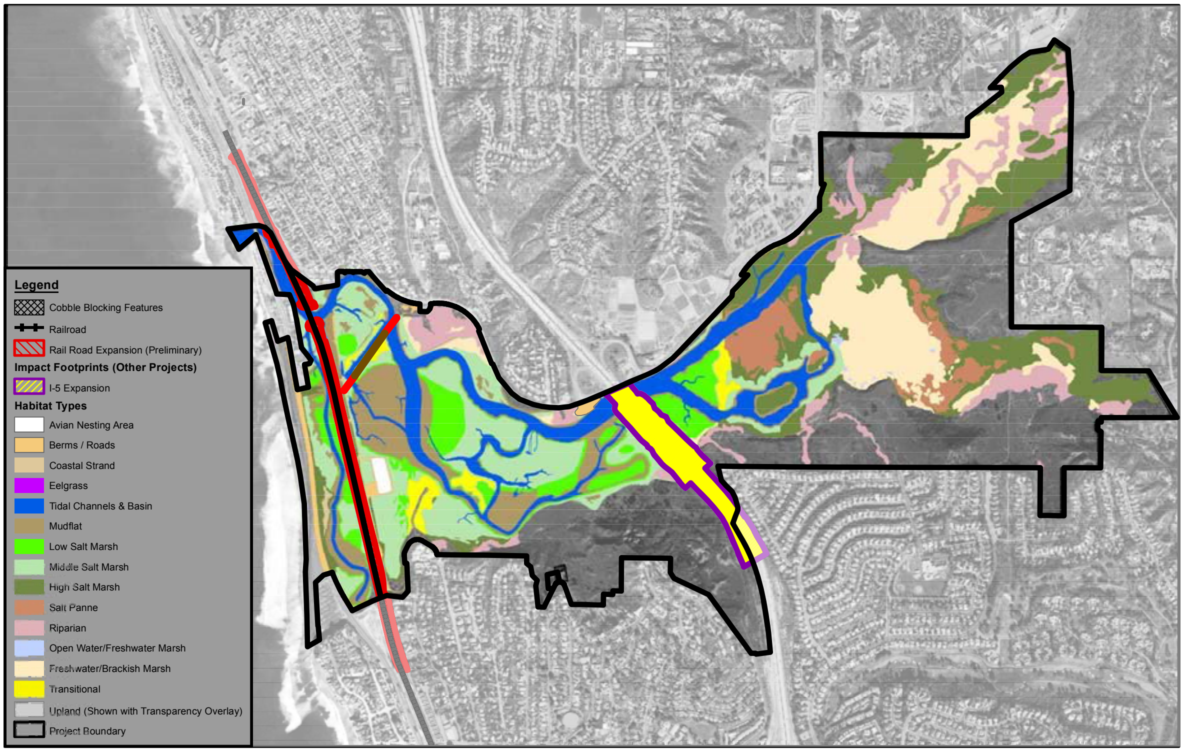
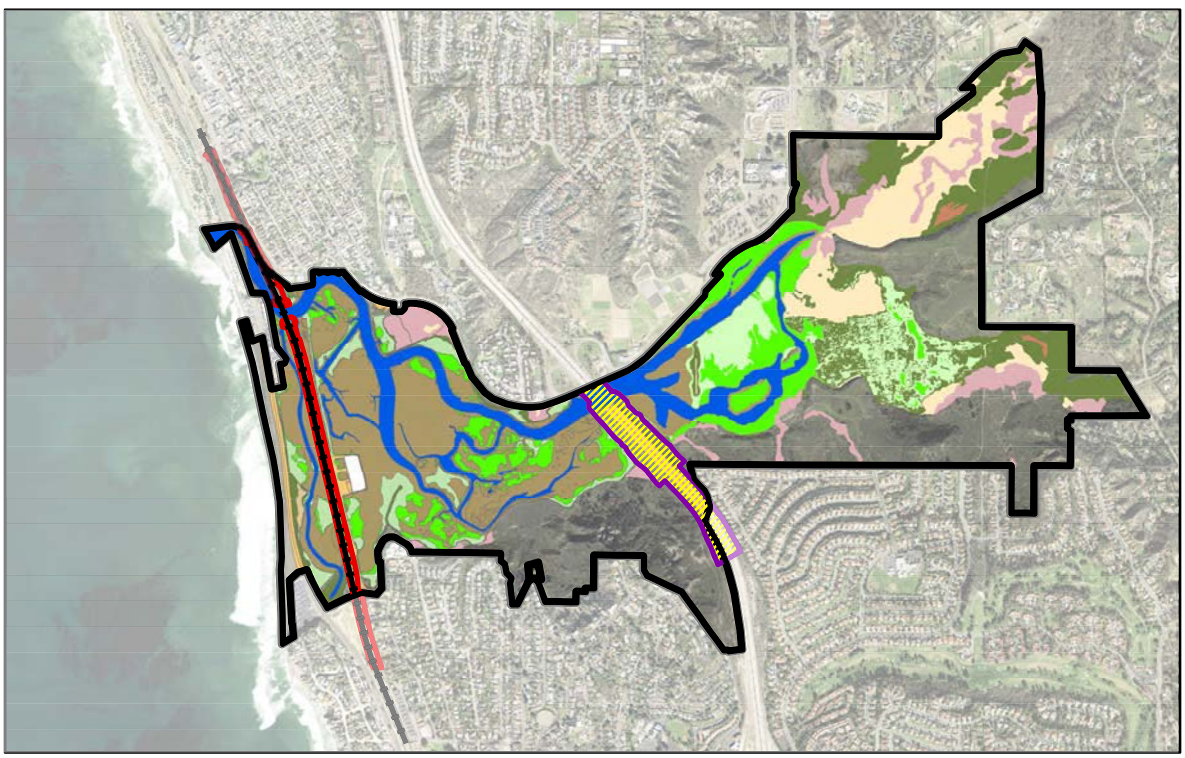


Modeled Post-Restoration Conditions



Modeled 2065 Conditions

Figure 3.16-3
Alternative 1B Generalized Habitat Distribution With Sea Level Rise

Alternative 1A

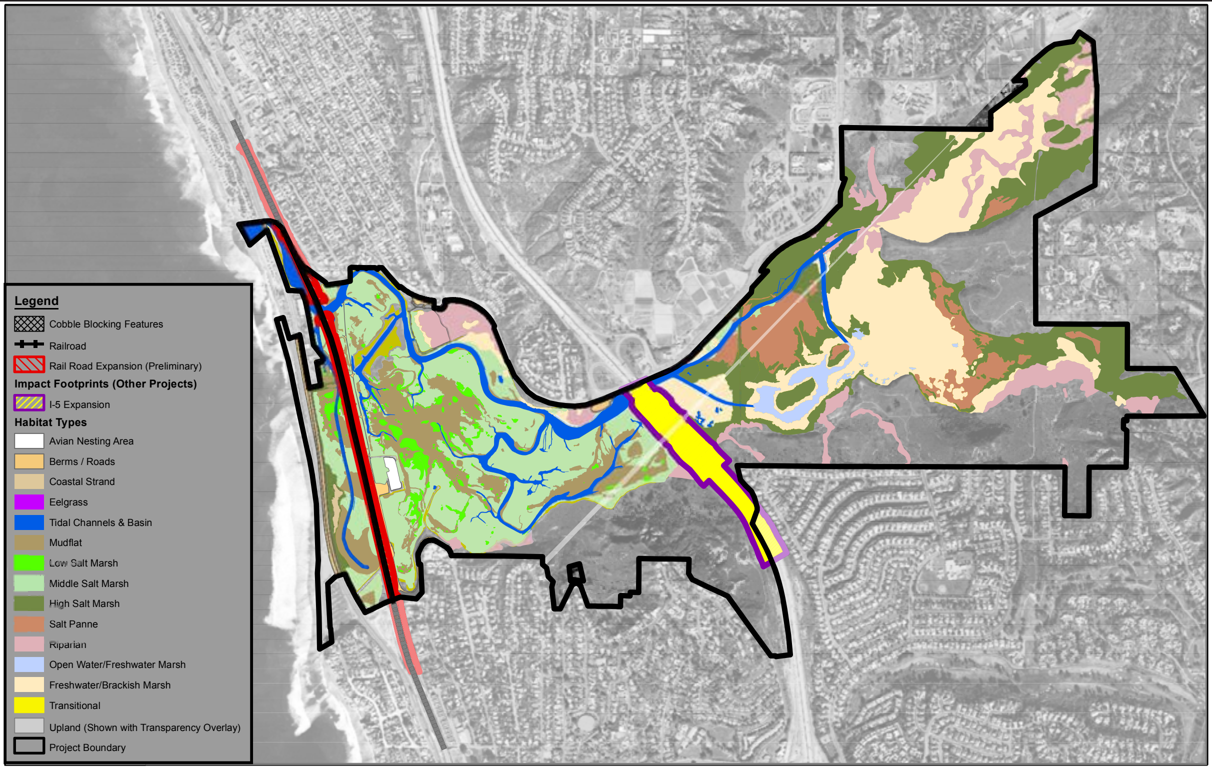
Alternative 1A would provide better tidal exchange between the lagoon and ocean, increasing tidal range in the lagoon and enhancing its ability to respond slowly to changes in sea level, although likely not to the same extent as Alternative 1B or Alternative 2A. While Alternative 1A offers improvement in flood elevation over existing conditions, sea level rise under 1A would result in water levels up to 4 feet above the elevation of Manchester Avenue throughout the central and east basins in a 2065 100-year storm. Figure 3.16-4 illustrates the generalized habitat distribution change over time (from existing conditions to 2065) with sea level rise. Habitat is anticipated to transition under Alternative 1A, but to a lesser degree than predicted under Alternatives 2A and 1B due to the continued hydraulic inefficiencies in the lagoon. Table 3.16-8 shows the predicted habitat distribution under Alternative 1A; freshwater and brackish marsh and salt panne areas would be anticipated to convert to salt marsh, and the central basin would increase in mudflat areas. The flood elevation would improve in some areas but decline in the east basin. The lagoon would benefit from continued opening of the existing inlet and annual maintenance, allowing additional opportunity to respond to long-term climate change impacts.

No Project/No Federal Action Alternative

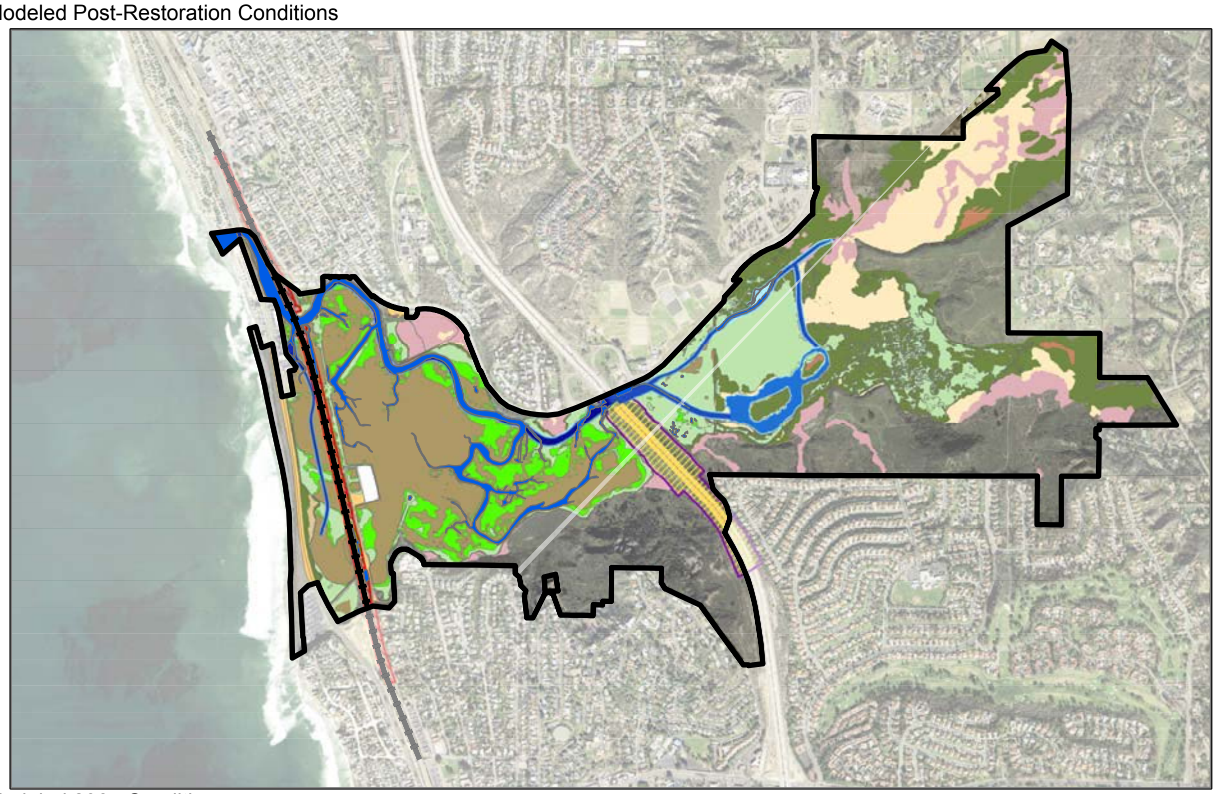
The lagoon would function similar to current conditions under a No Project/No Federal Action Alternative. As shown in Figures 3.16-1 and 3.16-5, sea level rise would affect water levels and habitat distribution in the project area. When future sea level rise is taken into consideration, water levels would be expected to rise up to 5 feet above Manchester Avenue throughout the east and central basins in 2065 100-year flood conditions. The lagoon would continue to be inundated with freshwater from the east and have limited capacity to drain the water through flow to the ocean, converting the lagoon to open water habitat. Conversely, tidal ranges consistent with the ocean would not be maintained and would not provide a buffer to storm surges or flood events. Critical habitats could shift to freshwater habitats or more subtidal habitats, depending on drainage within the lagoon. Table 3.16-8 identifies predicted habitat distribution within the lagoon; while salt panne would decrease as it converts to salt marsh habitats, the eastern portion of the east basin would not be anticipated to convert to salt marsh due to the continued hydraulic inefficiencies in the east basin.

Materials Disposal/Reuse

The vast majority of material from the restoration project would be placed either offshore, nearshore, or onshore depending upon the alternative in the very near term (2016 or 2017), which is well before extreme sea level rise or extreme events associated with climate change

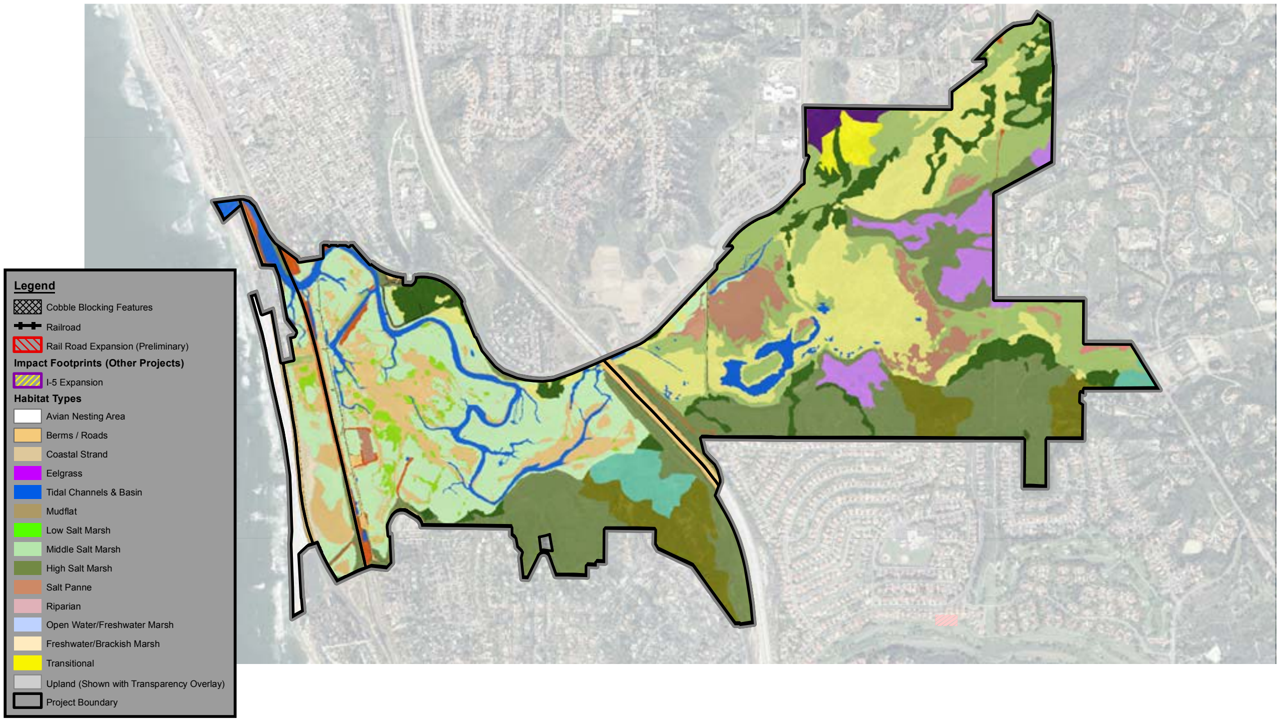


Modeled Post-Restoration Conditions

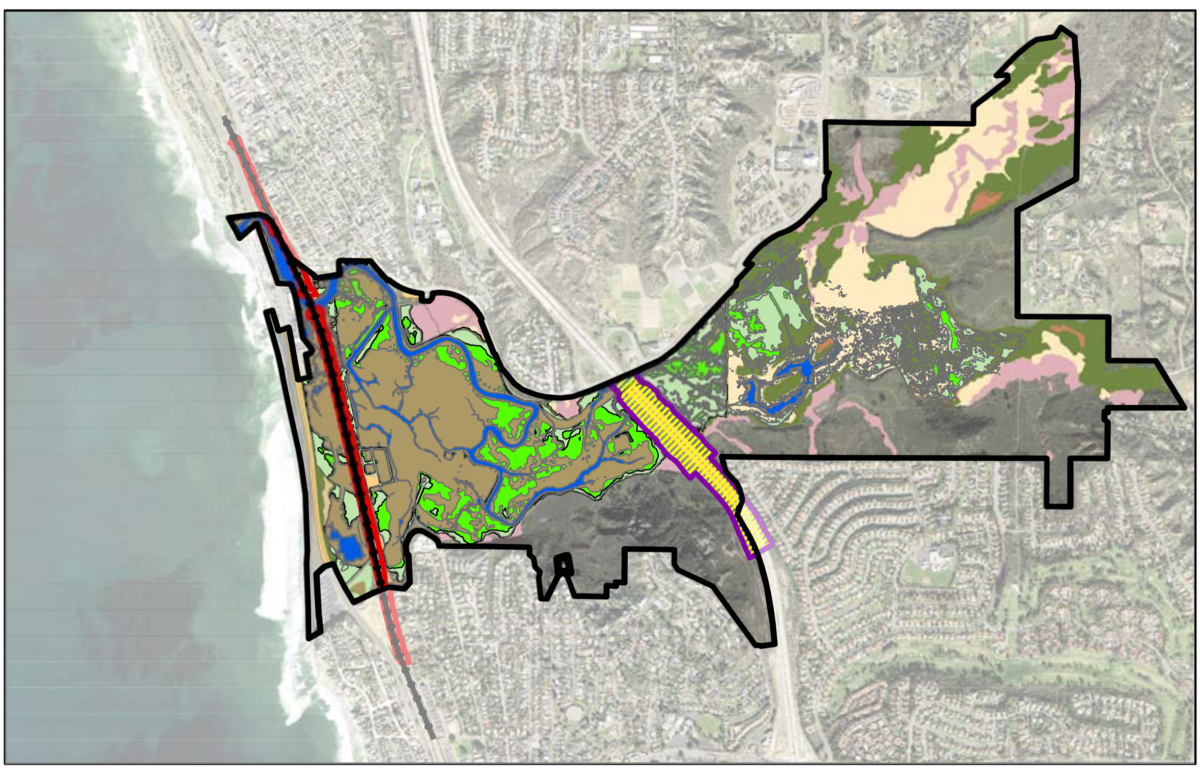


Modeled 2065 Conditions

Figure 3.16-4
Alternative 1A Generalized Habitat Distribution With Sea Level Rise



Existing Conditions (2012)



Modeled 2065 Conditions

Figure 3.16-5
No Project Generalized Habitat Distribution With Sea Level Rise

would be noticeable. However, it is possible that increased beach widths from onshore placement could provide temporary localized protection for structures on top of eroding bluffs, or infrastructure close to sea level and subject to ocean action, placed material is anticipated to disperse throughout the littoral cell and the volume of sand added to the entire littoral system from this one event would not be large enough to be noticeable over time. Materials placement associated with periodic inlet maintenance (30,000 to 300,000 cy) would also provide localized temporary benefits.

3.16.4 AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Construction-related and maintenance GHG emissions for Alternative 2A would exceed the recommended level of significance. Construction-related GHG emissions for Alternative 1B and Alternative 1A would exceed the recommended level of significance. As described in Table 2-26, project design features would be incorporated related to equipment maintenance and idling time to reduce GHG emissions associated with the project alternatives. Mitigation Measures AQ-1 through AQ-3 could also result in a reduction in GHG emissions. Although the tier engine standards are primarily based on improvements in NOx and PM emission levels, there would likely be benefits associated with the improved fuel efficiency and associated GHG emissions from the use of newer off-road engines. The following measures are also recommended to reduce GHG emissions for each alternative:

GHG-1 On-site material hauling shall be performed with trucks equipped with on-road engines to the extent practicable.

GHG-2 Limit deliveries of materials and equipment to the site to off-peak traffic congestion hours to the extent practicable.

GHG-3 Restrict material hauling on public roadways to off-peak traffic congestion hours to the extent possible. During construction scheduling and execution minimize, to the extent possible, uses of public roadways that would increase traffic congestion.

GHG-4 Use high-efficiency lighting and Energy Star-compliant heating and cooling units in construction trailers. Implement procedures for turning off computers, lights, air conditioners, heaters, and other equipment contained in these trailers each day at close of business.

The project currently proposes the use of a diesel dredge and/or an electric dredge. The potential benefit of requiring electric dredge use to reduce GHG emissions was evaluated. However, as described in Section 3.16.3, GHG emissions from an electric dredge and a diesel dredge do not differ substantially. Therefore, the sole use of an electric dredge was not considered an effective mitigation measure for GHG emissions. No additional feasible mitigation has been identified for GHG emissions from construction or operational activities.

3.16.5 Level of Impact after Mitigation

CEQA: Based on the level of construction activities anticipated with each project alternative, even with implementation of Mitigation Measures GHG-1 through GHG-4, construction emissions for all project alternatives would continue to exceed the screening threshold of 900 MT CO_2e per year. While Mitigation Measures GHG-1 through GHG-4 would reduce GHG emissions associated with the project alternatives, the level of potential reductions in GHG emissions cannot be accurately estimated. It is difficult to accurately estimate GHG emission reductions from construction activities since the type of construction equipment and fuel can affect total emissions (e.g., equipment using natural gas or other alternative fuels could actually increase GHG emissions compared to diesel engines). In addition, the annual emission reductions may vary based on the construction schedule and the extent to which the measures are implemented (e.g., number of trucks operating with on-road engines). Therefore, implementation of Mitigation Measures GHG-1 through GHG-4 would not be anticipated to reduce emissions associated with construction of the project alternatives by more than 16 percent compared to the unmitigated emissions. This impact would be a considerable contribution to cumulative climate change and would remain significant and unavoidable.

NEPA: The estimated emissions for all project alternatives would not exceed the CEQ emission thresholds. Therefore, no substantial adverse direct or indirect effects would occur.

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CHAPTER 4.0
COMPARISON OF ALTERNATIVES

4.1 INTRODUCTION

This chapter compares the alternatives described in Chapter 2 and evaluated in Sections 3.1 through 3.16. Both CEQA and NEPA require analysis of a reasonable range of alternatives. Accordingly, this draft EIR/EIS analyzes alternatives that feasibly meet the objectives of the proposed project, along with the No Project Alternative (CEQA) and the No Federal Action Alternative (NEPA). Each alternative is analyzed in equal level of detail. This level of analysis is included to provide sufficient information and meaningful detail about the environmental effects of each alternative so that informed decision-making can occur.

As described in Chapter 2, the proposed project has two components: (1) restoration of San Elijo Lagoon and (2) materials disposal/reuse of dredged materials from the lagoon. These project components were analyzed independently from one another throughout the EIR/EIS, where appropriate. The lagoon restoration alternatives include:

- Alternative 2A
- Alternative 1B
- Alternative 1A
- No Project/No Federal Action Alternative

The materials disposal/reuse scenarios are described in Chapter 2, Table 2-21. They include options for materials placement either offshore, nearshore, or onshore and are dependent on the volume and quality of material.

Other alternatives that were considered but eliminated during the alternatives screening process are summarized in Section 2.2.2.

4.2 EVALUATION OF ALTERNATIVES

CEQA

The CEQA Guidelines (14 CCR Section 15126.6) require that an EIR present a range of reasonable alternatives to the project, or to the location of the project, that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any significant effects of the project. Section 15126.6 of the CEQA Guidelines also requires an evaluation of the comparative merits of the alternatives. An EIR is not required to consider alternatives that are infeasible.

Table 4-1 summarizes the results of the CEQA impact analysis for each resource area.

Table 4-1
CEQA Significance Conclusions by Alternative

	Alternative 2A		**Alternative 1B**		**Alternative 1A**		**No Project/No Federal Action**	
Environmental Resource Area	**LR**	**MP**	**LR**	**MP**	**LR**	**MP**	**LR**	**MP**
Land Use/Recreation	L	L	L	L	L	L	L	L
Hydrology	L	N	L	N	L	N	L	N
Oceanography/Coastal Processes	L	L	L	L	L	L	L	L
Water and Aquatic Sediment Quality	M	L	M	L	M	L	L	L
Geology/Soils	M	L	L	L	L	L	N	N
Biological Resources	S	L	S	L	S	L	L	L
Cultural Resources	M	N	M	N	M	N	N	N
Paleontological Resources	M	N	M	N	M	N	N	N
Visual Resources	S	L	S	L	L	L	N	N
Traffic, Access, and Circulation	S	L	S	L	S	L	N	N
Air Quality	S	–	S	–	S	–	L	–
Noise	S	S	S	S	S	L	N	N
Socioeconomics/Environmental Justice	L	L	L	L	L	L	N	N
Public Services and Utilities	L	L	L	L	L	L	N	N
Hazardous Materials and Public Safety	M	L	M	L	M	L	L	L
Global Climate Change and Greenhouse Gas Emissions	S	–	S	–	L	–	L	–

LR = Lagoon Restoration
MP = Materials Placement
S = Significant unavoidable impact
M = Significant but mitigable to less than significant impact
L = Less than significant impact
N = No impact
– = Lagoon restoration and materials disposal/reuse analyzed together

NEPA

NEPA (40 CFR Section 1502.14[a]) requires that an EIS explore and evaluate a range of reasonable alternatives to the project. The CWA Section 404(b)(1) Guidelines (40 CFR Part 230) also address alternatives, stating that no discharge of dredged or fill material will be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as that alternative does not have other significant adverse environmental consequences. Chapter 2 of this draft EIR/EIS sets forth potential alternatives to the recommended plan, and Sections 3.1 through 3.16 evaluate their environmental impacts.

Table 4-2 summarizes potential adverse effects identified per NEPA for each resource area.

Table 4-2
NEPA Conclusions by Alternative

Environmental Resource Area	Alternative 2A		Alternative 1B		Alternative 1A		No Project/No Federal Action	
	LR	MP	LR	MP	LR	MP	LR	MP
Land Use/Recreation	N	N	N	N	N	N	N	N
Hydrology	N	N	N	N	N	N	N	N
Oceanography/Coastal Processes	N	N	N	N	N	N	N	N
Water and Aquatic Sediment Quality	N	N	N	N	N	N	N	N
Geology/Soils	N	N	N	N	N	N	N	N
Biological Resources	A	N	A	N	A	N	N	N
Cultural Resources	N	N	N	N	N	N	N	N
Paleontological Resources	N	N	N	N	N	N	N	N
Visual Resources	A	N	A	N	N	N	N	N
Traffic, Access, and Circulation	A	N	A	N	A	N	N	N
Air Quality	N	–	N	–	N	–	N	–
Noise	N	N	N	N	N	N	N	N
Socioeconomics/Environmental Justice	N	N	N	N	N	N	N	N
Public Services and Utilities	N	N	N	N	N	N	N	N
Hazardous Materials and Public Safety	A	N	A	N	A	N	N	N
Global Climate Change and Greenhouse Gas Emissions	N	–	N	–	N	–	N	–

LR = Lagoon Restoration
MP = Materials Placement
A = Substantial adverse effect
N = No substantial adverse effect
– = Lagoon restoration and materials disposal/reuse analyzed together

4.3 ANALYSIS OF IMPACTS OF ALTERNATIVES

Overall, less than significant impacts or impacts that can be mitigated to less than significant under CEQA for all alternatives include land use/recreation, hydrology, oceanography/coastal processes, water and aquatic sediment quality, geology/soils, cultural resources, paleontological resources, socioeconomics/environmental justice, public services and utilities, and hazardous materials and public safety. Exceptions include the significant and unavoidable impacts that would occur for biological resources; visual resources; traffic, access, and circulation; noise; air quality; and global climate change and GHG emissions as detailed in Section 4.3.1 below.

Substantial adverse impacts identified under NEPA include biological resources; visual resources; traffic, access and circulation; and hazardous materials and public safety. Mitigation is proposed for all substantial adverse impacts that would occur.

When comparing the lagoon restoration component and the materials disposal/reuse component of the SELRP, significant and substantial adverse impacts only occur as a result of the lagoon restoration actions for Alternative 2A, Alternative 1B, and Alternative 1A. Under all alternatives, the materials disposal/reuse activities would result in less than significant impacts with no mitigation required, and no substantial adverse impacts would occur.

4.3.1 RESOURCES WITH SIGNIFICANT UNAVOIDABLE IMPACTS

Biological Resources

Restoration construction would result in greater than 50 percent temporal loss of sensitive habitats including coastal salt marsh (low- and mid-), open water, saltpan/open water, and tidal mudflats. Because the temporal loss of these habitats may threaten local populations of sensitive resident species, this short-term direct impact is considered significant and adverse. Additionally, significant short-term impacts were identified for Alternative 2A and Alternative 1B to Belding’s savannah sparrow, due to the temporary loss of greater than 50 percent of their nesting habitat. While no feasible mitigation is available for the short-term direct loss of the nesting habitat and the impact would remain significant, the short-term impacts would be balanced out by the long-term benefits of lagoon restoration, as the overall ecological benefits from lagoon restoration would provide long-term improved habitat quality.

Significant and unavoidable short-term noise impacts to sensitive bird species would occur as a result of construction activities under Alternative 2A, Alternative 1B, and Alternative 1A. When in proximity to wildlife, the effects of dredge and other construction noise may disrupt sensitive birds foraging or breeding behavior. The dredge is slow and would be operating in one basin at a time; as such, most birds could relocate to quieter habitat. However, relocation during the breeding season is not feasible for nesting birds and, even with the numerous project design features to reduce noise levels, this is considered a significant and unavoidable impact.

Visual Resources

Significant and unavoidable long-term visual impacts would result from the new inlet and CBFs on either side as proposed for Alternative 2A. The permanent inlet features would introduce highly linear elements into the beach landscape that would result in a substantial contrast from the existing visual environment and beach character for sensitive beachgoers. This significant unavoidable visual impact would only occur with implementation of Alternative 2A as Alternative 1B, Alternative 1A, and the No Project/No Federal Action Alternative would not include construction of a new inlet and CBFs.

Significant and unavoidable temporary visual impacts would result from the change in visual quality and character of the lagoon for key viewers during construction of Alternative 2A and Alternative 1B. Vegetation would be removed from a large portion of the central basin and substantial landform alteration would occur along with the presence of construction equipment and lighting. Such activities would be temporary but highly visible because of the contrast in color and texture with vegetation being replaced by exposed soil. This significant unavoidable visual impact would only occur with implementation of Alternative 2A and Alternative 1B as Alternative 1A and the No Project/No Federal Action Alternative would result in a less extensive visual change, both temporally and spatially, during lagoon restoration.

Traffic, Access, and Circulation

Significant and unavoidable temporary traffic impacts would result during Coast Highway 101 bridge construction under Alternative 2A and retrofitting under Alternative 1B and Alternative 1A. The significant traffic impacts would occur along segments of Coast Highway 101 and Lomas Santa Fe during construction or retrofitting activities that require restriction of the bridge to two lanes of traffic. These impacts would be temporary, occurring only during new bridge construction or retrofitting activities that require lane closure on the roadway. Traffic would return to normal operating conditions once all four lanes of traffic were fully operational. No other component of the proposed lagoon restoration or materials disposal/reuse would result in significant traffic impacts. All mitigation options were considered and feasible mitigation is included but would not reduce the impact to less than significant. This significant unavoidable traffic impact would occur with implementation of Alternative 2A, Alternative 1B, and Alternative 1A, but the No Project/No Federal Action Alternative would not include Coast Highway 101 bridge construction or retrofitting activities.

Air Quality

Under CEQA, significant and unavoidable temporary construction-related air quality impacts would result during construction activities associated with Alternative 2A, Alternative 1B, and Alternative 1A. Construction-generated ROG and NO_X emissions for all three alternatives would exceed applicable mass emission thresholds, resulting in a significant impact to regional air quality. Feasible mitigation is included but would not reduce the impact to less than significant.

Additionally, Alternative 2A would cause significant and unavoidable operation-related air quality impacts. NO_X emissions associated with maintenance activities under Alternative 2A would exceed the applicable mass emission thresholds, resulting in a significant impact to regional air quality. Feasible mitigation is included but would not reduce the impact to less than significant.

Noise

Due to nighttime dredging and materials placement activities, significant impacts have been identified under CEQA for each of the alternatives due to lagoon restoration activities and materials disposal/reuse activities associated with SELRP. Design features have been incorporated into the project to minimize equipment noise during construction at nearby residences, including housing exposed engines and ensuring equipment has effective mufflers. At materials placement sites, construction would be limited to 3 consecutive nights within a distance that could disturb sleep at a given residence (100 feet). Even with implementation of these measures nighttime construction outside of allowed hours would result in significant impacts. Mitigation such as noise walls and limiting dredging and materials placement activities to daytime hours was considered to reduce this impact but found infeasible.

Global Climate Change and Greenhouse Gas Emissions

Under CEQA, significant GHG emissions would result during construction operations under Alternative 2A and Alternative 1B. Climate change and GHG emissions are a cumulative impact and therefore emissions associated with individual project components of lagoon restoration and materials disposal/reuse must be evaluated together. Emissions would result from construction activities including mobilization/demobilization, site preparation, construction equipment and on-road vehicles, dredging, and materials disposal. The County of San Diego has established a threshold of 900 MT CO2e per year as a project-level GHG significance. The GHG emissions from construction and maintenance activities associated with lagoon restoration and materials disposal/reuse for Alternative 2A and Alternative 1B exceed the significance threshold of 900 MT CO2e per year used for analysis of this project. No mitigation measures are available to reduce emissions to less than significant. Construction and maintenance GHG emissions for Alternative 1A would not exceed the recommended level of significance

4.3.2 COMPARISON OF ALTERNATIVES

Alternative 2A includes the largest amount of dredging and material removal for lagoon restoration, thus also requiring the largest volume of material disposal. Additionally, Alternative 2A includes the construction of a new Coast Highway 101 bridge and a new inlet and associated

CBFs. These additional activities result in derivative effects such as a higher volume of truck trips, increased areas of disturbance, longer construction durations, and higher noise levels, among others, as compared to the other alternatives. Thus, the degree of adverse impact for Alternative 2A, relative to the other project alternatives that do not include the high volume of dredging or other additional elements, is typically higher for almost all issue areas. Alternative 2A would cause a long-term significant visual impact due to the new inlet/CBFs that would not occur under the other alternatives. Hazardous materials/public safety impacts are considered significant and would require mitigation due to construction of a new inlet under Alternative 2A to reduce impacts to below a level of significance. Construction of a new Coast Highway 101 bridge under Alternative 2A would require mitigation to reduce potential unstable geologic conditions. Ongoing maintenance activities would result in significant air quality impacts with implementation of Alternative 2A. The other project alternatives were found to have less than significant air quality impacts associated with ongoing maintenance. Coast Highway 101 bridge construction under Alternative 2A has the potential for impacts to unknown cultural resources and requires specific CEQA mitigation in addition to mitigation described below for the other alternatives.

Alternative 1B typically has similar impacts to Alternative 2A, except as described above due to additional project elements associated only with Alternative 2A. Alternative 1B proposes removal of 1.2 mcy of material as compared to Alternative 2A, which proposes 1.4 mcy; thus, impacts associated with dredging operations and materials placement are fairly similar for these two alternatives. Alternative 1B would result in a short-term significant unmitigable visual impact during lagoon restoration activities, as would Alternative 2A. This impact would be substantially adverse.

Alternative 1A includes approximately 160,000 cy, which is substantially less dredging than Alternative 2A and Alternative 1B. This reduces the amount and degree of severity of impacts that result from Alternative 1A, relative to the other two alternatives for both lagoon restoration and materials disposal/reuse. Significant and unavoidable short-term noise impacts to sensitive bird species would occur as a result of construction activities under Alternative 2A, Alternative 1B, and Alternative 1A. Alternative 2A would have the most substantial impact as it includes the highest volume of dredging. Alternative 1A would have the least substantial impact due to the relative decrease in volume, footprint, and duration of dredging. Alternative 2A, Alternative 1B, and Alternative 1A require CEQA mitigation for potential water quality impacts from turbidity generated during dredging operations. Alternative 2A, Alternative 1B, and Alternative 1A would result in significant unavoidable adverse air quality impacts during construction. Alternatives 2A and 1B would result in GHG emissions in excess of the 900 MT CO_2e significance threshold. GHG emissions from Alternative 1A would not exceed this threshold. Alternative 2A, Alternative 1B, and Alternative 1A require CEQA mitigation for potential impacts to buried human remains and inadvertent disturbance of cultural resources. Paleontological impacts could result from grading in sensitive formations and require CEQA mitigation under Alternative 2A, Alternative 1B, and Alternative 1A. Temporary traffic impacts associated with Coast Highway 101 bridge construction or retrofitting would be significant under all three alternatives. Alternative 2A, Alternative 1B, and Alternative 1A would have the potential to create a public health hazard from unknown contamination of dredged/excavated material, though Alternative 1A would have the lowest potential for this impact due to the limited amount of dredging proposed. Alternative 1A would not result in adverse or significant impacts to visual resources but Alternative 2A and Alternative 1B would.

However, the high volume of dredging associated with Alternative 2A and Alternative 1B would also increase the beneficial impacts of the proposed project, such as improved tidal flow and healthier lagoon habitats. With reduced dredging, as proposed under Alternative 1A, the positive impacts, such as increased tidal flow and improved lagoon habitats that are associated with Alternative 2A and Alternative 1B, would not occur to the same degree. Because no onshore material placement would occur, the beneficial impacts associated with the beach nourishment, including reduced risk to coastal structures and a visually enhanced sandy beach, would not occur under Alternative 1A.

The No Project/No Federal Action Alternative would not modify existing conditions and no actions would take place. Thus, no significant environmental impacts would occur from this alternative. However, the lagoon would continue to deteriorate in habitat quality and hydrologic conditions if the SELRP is not completed. While no significant adverse impacts would occur, none of the beneficial or positive impacts that occur with implementation of one of the project alternatives would result under the No Project/No Federal Action Alternative.

The project is a restoration effort and has many proactive design features specifically included to minimize or reduce the potential for adverse effects to result from project implementation. In addition, mitigation has been proposed for substantial adverse impacts or impacts that were identified as significant. In some cases, such as cultural resources, geology and soils, water and aquatic sediment quality, air quality, and hazardous materials and public safety, the proposed mitigation was found to be adequate to reduce the adverse effect and result in less than significant impacts. However, for the resource areas of biological resources; visual (Alternative 2A and Alternative 1B only); traffic, access, and circulation; noise; air quality; and GHG (Alternative 2A and Alternative 1B only), the proposed mitigation would provide for some reduction of impact but would not fully reduce the impact to a level considered less than significant.

4.4 ENVIRONMENTALLY PREFERRED AND SUPERIOR ALTERNATIVE

CEQA

CEQA requires disclosure of the environmentally superior alternative and, if the No Project/No Federal Action Alternative is environmentally superior, identification of a superior alternative among the other alternatives (Section 15126.6[e][2]).

Among the action alternatives (Alternative 2A, Alternative 1B, and Alternative 1A), Alternative 1A would result in the least CEQA significant environmental impacts as shown in Table 4-1. Alternative 1A would not result in the significant and unavoidable visual impact that would result from the other two alternatives. Additionally, Alternative 1A would not have a significant impact on air quality requiring mitigation. Because of the reduced dredging activity, reduced construction time, and least amount of disturbance to the lagoon setting relative to the other alternatives, many of the impacts that would result from Alternative 1A would also be to a lesser degree and extent than those resulting from Alternative 2A and Alternative 1B. However, the beneficial environmental impacts from Alternative 1A would also be less than for the other alternatives, such as reduced improvements to lagoon hydrologic function and drainage patterns, fewer improvements to water quality, fewer enhanced habitat and biological benefits, and no beach material replenishment. As a result of the minimized dredging and reduced benefits, Alternative 1A does not achieve the CEQA project objectives, as listed in Section 1.2, to the fullest extent or to the same level as the other action alternatives. Most specifically, Alternative 1A does not achieve the following objectives: (1) physical restoration of lagoon estuarine hydrologic functions and (2) biological restoration of habitat and species within the lagoon to the same extent as the other alternatives.

NEPA

Section 1505.2(b) of the CEQ Regulations requires NEPA lead agencies to identify the "environmentally preferable alternative" at the time of making a decision on the project. The NEPA purpose of the proposed project is to enhance and restore the physical and biological functions and services of San Elijo Lagoon by increasing hydraulic efficiency in the lagoon, addressing existing water quality impairments, and halting ongoing conversion of unvegetated wetland habitats to support a more connected gradient of balanced habitat types.

Alternative 2A would meet the NEPA purpose of the project as it would increase the tidal prism and result in enhanced lagoon function and high-quality intertidal and transitional habitats. Habitat distributions under Alternative 2A would include an increase in open water areas/tidal channels and mudflat habitat within the lagoon compared to existing conditions. Open water areas and tidal channels would be increased in all three lagoon basins compared to existing conditions. Mudflat and open water/tidal channels would be actively created throughout the central basin and would replace existing mid-marsh and low-marsh habitat. Similarly, open water/tidal channels and low-marsh would be actively created in the east basin where freshwater/brackish marsh currently exists. This alternative also includes the creation of 12 acres of transitional habitat in the east and central basins. Water quality impairments identified on the Section 303(d) list, including sedimentation and eutrophication, would also be addressed by this alternative through increased hydraulic efficiency and high-nutrient sediment removal. Substantial adverse impacts would result with implementation of this alternative.

Alternative 1B would meet the NEPA purpose of the project as it would create a more connected gradient of balanced habitat types relative to existing conditions through modifications to channels and habitat areas within the lagoon. Alternative 1B would result in an increase in open water/tidal channels, low-marsh, mudflat, and created transitional habitat compared to existing conditions. Most of the increase in open water/tidal channels and mudflat habitat would occur in the central and east basins, and would result in a corresponding decrease in mid-marsh, saltpan, and freshwater/brackish marsh habitats. This alternative includes the creation of 15 acres of transitional habitat in both the east and central basins. Water quality impairments identified on the Section 303(d) list, including sedimentation and eutrophication, would also be addressed by this alternative through increased hydraulic efficiency and high-nutrient sediment removal. Substantial adverse impacts would result with implementation of this alternative.

Alternative 1A would not meet the NEPA project purpose. Although the tidal prism would be slightly increased compared to existing conditions, the CDFW dike would remain in place, with 2 new channels enhancing drainage. Residence times in the east basin and portions of the central basin would remain above 7 days, resulting in limited improvements to circulation. Fluvial flows would remain constricted as they exit the lagoon even with the CDFW channel improvements. This continued hydraulic inefficiency would result in continued sedimentation and substantial periods of high bacteria at the lagoon inlet after storm events, as described in Section 3.4. The majority of high nutrient sediments would remain intact in the lagoon, resulting in continued eutrophication. With implementation of Alternative 1A, the project would result in slightly improved hydrologic function but would not address existing water quality impairments identified on the 303(d) list. Conversion of habitat from unvegetated wetland to vegetated salt marsh occurring under existing conditions would continue to occur, and would not be halted; therefore Alternative 1A would not meet the NEPA purpose.

CHAPTER 5.0
CUMULATIVE IMPACTS

CEQA Guidelines require a discussion of cumulative impacts of a project “when the project’s incremental effect is cumulatively considerable.” (2011 CEQA Guidelines, Section 15130). As defined by Section 15065 (a)(3) “cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (2011 CEQA Guidelines, Section 15065 (a)(3). These cumulative impacts are defined as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts” (CEQA Guidelines Section 15355).

The discussion of cumulative impacts is further guided by CEQA Guidelines Section 15130(a) and (b), which states the following:

- An EIR shall not discuss impacts which do not result in part from the project evaluated in the EIR.
- When the cumulative effect of the project’s incremental contribution and the effect of the other projects is not significant, the EIR shall briefly indicate why and not discuss it further.
- An EIR may identify a significant cumulative effect, but determine that a project’s contribution is less than significant. That conclusion could result if the project is required to implement or fund its fair share of a mitigation measure designed to alleviate the cumulative impact.
- The discussion of cumulative impacts shall reflect the possibility of occurrence and severity of the impacts and focus on cumulative impact to which the identified other projects could contribute.

Federal regulations implementing NEPA also require that the cumulative impacts of a proposed action be assessed. NEPA defines a cumulative impact as an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (40 CFR 1508.7). Additionally, NEPA states that cumulative effects can be the result of individually minor but collectively significant actions which take place over a period of time (40 CFR 1508.7). NEPA also requires a determination of the nature and degree of effect that a proposed discharge will have, both individually and cumulatively, on the structure and function of the aquatic ecosystem and organisms (40 CFR 230.11(g)).

In general, effects of a particular action or a group of actions would be considered cumulative impacts under the following conditions:

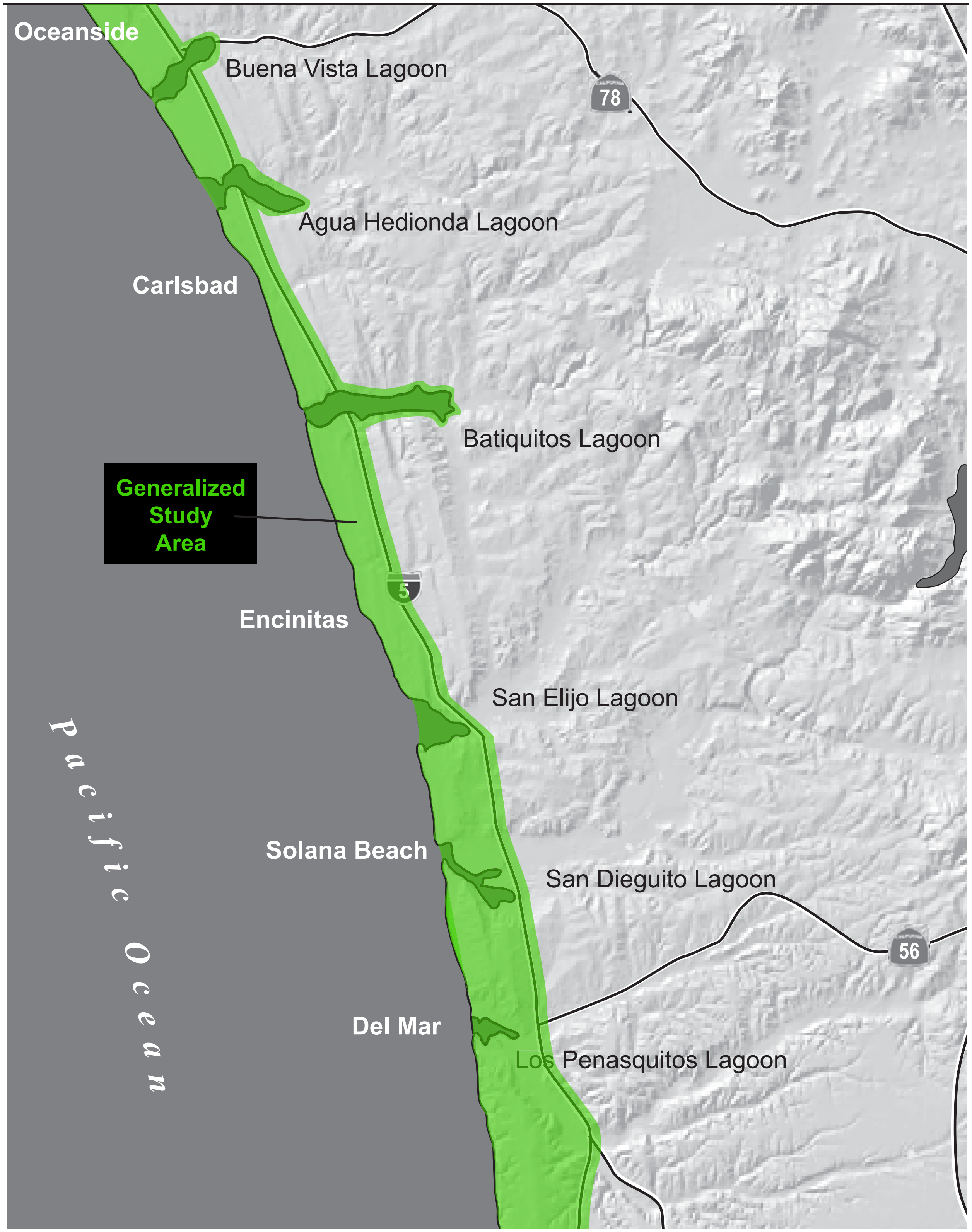
- effects of several actions in a common location,
- effects are not localized (i.e., can contribute to effects of an action in a different location),
- effects on a particular resource are similar in nature (i.e., they affect the same specific element of a resource), and
- effects are long term (short-term impacts tend to dissipate over time and cease to contribute to cumulative impacts).

5.1 DESCRIPTION OF CUMULATIVE ENVIRONMENT

The study area for this cumulative analysis varies somewhat by issue area but for most issues is the north county coast, with a focus on Solana Beach and Encinitas given their proximity, plus key lagoons from Carlsbad to Del Mar. One key exception is air quality, which is addressed at a regional (county-wide) level because standards are set by ARB at this more gross scale (Figure 5-1).

There are six lagoons along northern San Diego County with a long history of human modifications, particularly construction of north-south infrastructure like roads and rail that run perpendicular to each of the lagoon features. Only in the past few decades has the focus been on ecological restoration of those lagoons. The most recent is restoration at San Dieguito Lagoon where planning and implementation occurred between 1997 and 2011. Here, fill was removed to transform upland/farmland acreage to wetland habitat. Restoration of Batiquitos Lagoon was implemented over 15 years ago to create a more tidally open system. The planning efforts at San Elijo Lagoon have been underway for more than 10 years, and planning for enhancement of Buena Vista Lagoon was recently reinitiated. Substantial beach nourishment efforts were associated with restoration at Batiquitos Lagoon (over 1.8 mcy more than 15 years ago) and lagoon functional improvements for infrastructure facilities at Agua Hedionda Lagoon (500,000+ cy).

Additionally, there have been many projects involving materials placement on local beaches along the San Diego region coastline. Several involved placing sand from large- and small-scale maintenance dredging onto nearby beaches. There was also the large-scale 2001 RBSP offshore



Note: Air Quality is addressed at the regional APCD level

No Scale

Figure 5-1
Generalized Cumulative Study Area

dredging effort, which placed 2 mcy of sand along 12 locations from Oceanside to Imperial Beach. The 2012 RBSP placed 1.5 mcy of material on eight receiver sites along this same coastline, including locations within the current project study area. Much smaller replenishment actions have resulted from opportunistic projects from upland coastal development.

Thus, the study area has a long history of project actions (restoration and beach nourishment) at lagoons and along the coast.

5.2 PROJECTS CONSIDERED IN THE CUMULATIVE IMPACTS ANALYSIS

The cumulative projects considered in the following analysis are listed in Table 5-1 and the cumulative study boundary is noted in Figure 5-1. Most of the projects are located along the Encinitas and Solana Beach coastlines; however, key infrastructure projects are slightly inland and parallel to the coast. Key lagoons to the north and south are noted as well because recreational and habitat resources are similar between these lagoons and can be somewhat interchangeable regionally for people and wildlife. If the geographic scope is expanded or narrowed for a specific topic area, it is described in the appropriate section.

Table 5-1 identifies the project name, the jurisdiction within which the action would occur or has occurred, a brief description, and the anticipated schedule for implementation. This list primarily includes planned projects that are on file with local jurisdictions or agencies. Relevant, known projects that have not yet begun the planning process may also be included in this list for the purposes of disclosure, although adequate information may not be available at this time to determine their potential cumulative contribution. Additionally, recently completed projects are also included on the list for informational purposes, even though the environmental effects of a previously completed project would be considered in existing conditions and included in the overall baseline. The city-wide Sand Compatibility and Opportunistic Use Program (SCOUP) efforts are noted for the various cities that have adopted the concept, although total authorized volumes have not yet been placed at any approved receiver site. It is unknown if the full placement amounts would occur given they are based on by-products of other approved projects. However, the few modest sand placements that have occurred via the SCOUP structure are noted under the City of Encinitas. No placement has occurred to date in Solana Beach. Programmatic policy documents (i.e., Coastal Regional Sediment Management Plan, Shoreline Preservation Strategy, General Plan updates) are not included in the cumulative project list, as those are considered strategic planning documents that do not necessarily provide authority for implementation and generally do not identify specific projects.The Storm Damage Reduction Project proposed by the Corps and cities of Solana Beach and Encinitas is noted in Table 5-1. If implemented, the project could occur at a similar time as the SELRP; however, material to be placed at beach sites in Solana Beach and Encinitas by both projects would not be additive.

Table 5-1
Cumulative Projects List – San Elijo Lagoon Restoration

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
Various Jurisdictions				
2012 RBSP	Oceanside, Carlsbad, Encinitas, Del Mar, Solana Beach, San Diego, Imperial Beach	Sand Nourishment	The project involved beach replenishment of the San Diego region's eroding beaches with 1.5 mcy of dredged sediment from three offshore borrow sites. This project involves four main functions: (1) to replenish the littoral cells and receiver sites with suitable beach sand; (2) to provide enhanced recreational opportunities and access at the receiver sites; (3) to enhance the tourism potential of the San Diego region; and (4) to increase protection of public property and infrastructure. Several receiver sites from this 2012 project, and a similar regional project in 2001, are within the cumulative study area. Monitoring of the 2001 RBSP confirmed no long-term significant impacts to beach or offshore resources.	The project was completed in the fall of 2012 and the EIR/EA determined no long-term significant or adverse impacts. Post-construction physical monitoring is underway for 4 years after completion. Monitoring of the 2001 RBSP noted sand volumes at receiver locations were negligible 5 years post-project.
Sand Compatibility and Opportunistic Use Program (SCOUP)	Oceanside, Carlsbad, Encinitas, Solana Beach, Coronado, and Imperial Beach. (See also Encinitas and Solana Beach below for city-specific details.)	Opportunistic Sand Nourishment Program	Implementation of opportunistic sand replenishment program to allow for the processing of multiple beach replenishment projects over a 5-year period as material may become available from other active projects. For each jurisdiction, this program authorizes the issuance of a General Lease – Public Agency Use of Lands in the Pacific Ocean for a term of 5 years, but the start and end dates vary. Details regarding permitted placement volumes and receiver sites are noted in Encinitas and Solana Beach below. The other programs are both too distant (Coronado and Imperial Beach) or have not implemented any actions to date (Oceanside).	Plans approved by local jurisdictions; initially for 5 year terms that expired in 2013. However, City of Carlsbad extended their program until 2016 and Solana Beach for an additional 5 years. Extensions are in process for Oceanside and Encinitas, with the addition of new receiver sites.
One Paseo Project (SCOUP)	Project located in City of San Diego, but possible sand placement in Carlsbad, Encinitas, and/or Solana Beach	Opportunistic Sand Nourishment placement, as by-product of mixed use development	The project is a proposed mixed-use development in Carmel Valley with substantial residential, retail, office, and open space (800,000 to 1,800,000 square feet). It is possible that 300,000 cy of beach sand-compatible material could be hauled to the beach in one or more SCOUP participating cities.	EIR released May 2012; recirculated EIR October 2013. Significant unmitigable impacts to traffic and community character.
I-5 North Coast Corridor Project	San Diego north coast region, from San Diego to Oceanside	Highway Facility Improvements	Caltrans - District 11 proposes improvements to a 27-mile stretch of I-5 in San Diego County. The proposed project begins at La Jolla Village Drive in the City of San Diego and ends at Harbor Boulevard in the City of Oceanside (post mile 28.4/55.4). Currently, I-5 is an eight-lane freeway with some auxiliary lanes that are frequently over capacity and subject to traffic congestion and travel delays. This project proposes four build alternatives to add a combination of features that include High Occupancy Vehicle/Managed Lanes (HOV/ML) that support multiple occupancy vehicle travel, auxiliary lanes to reduce traffic weaving and congestion, a possible additional general purpose lane in each direction of travel, and Direct Access Ramps (DARs) to improve access to the HOV/MLs. The project is expected to be constructed in phases through 2040. Permitting still ongoing. A Public Works Plan (PWP)/Transportation Restoration Enhancement Program (TREP) has been prepared to identify mitigation and enhancement actions for the entire coastal corridor to mitigate for I-5 and railroad improvements and was approved by the California Coastal Commission in August 2014. These measures may include completion of bicycle and pedestrian connections, improving trails, upgrading new and existing transportation facilities, re-creation of habitat (upland and wetland), plus compensatory mitigation projects that would provide "functional lift" to coastal resources. The PWP/TREP identifies restoration of San Elijo Lagoon and/or Buena Vista Lagoon as opportunities. The stated intent is to improve ecological heath and hydrological connectivity as well as enhance critical coastal resources and habitats. Also within San Elijo lagoon, as part of a multi-agency effort to share fiber connections throughout the region, a fiber connection is proposed through the lagoon to connect Caltrans' fiber communications to LOSSAN. It would be an important connection for Caltrans in the near term because there is not currently a connection through the southern segment of the corridor. In the long term, this connection would provide important redundancy for both Caltrans and NCTD. Currently, the plan would run the conduit through the proposed berm and future pedestrian access of the SELRP to make the connection on the LOSSAN side (Peace 2015).	Notice of Preparation (NOP) October 2004 Draft EIR/EIS July 2010. Supplemental Draft EIS/EIR released August 2012. Final EIR/EIS issued October 2013. The PWP/TREP was approved by the California Coastal Commission in August 2014.
Los Angeles to San Diego Rail Corridor Improvements Project (LOSSAN) Rail Corridor Improvements	Throughout San Diego coastal region	Railway infrastructure improvements	During the next 20 years, SANDAG plans to construct nearly $820 million in improvements in the San Diego County section, including a primary effort to double-track the corridor from Orange County to downtown San Diego. To date, approximately half of the San Diego corridor has been double-tracked. Other infrastructure improvements include bridge and track replacements, new platforms, pedestrian undercrossings, and other safety and operational enhancements. The bridge in San Elijo Lagoon would be double-tracked. The cultural report for the project identified three resources within the	Portions of the project ongoing. Coastal corridor impacts from LOSSAN are also addressed in the PWP/TREP described above for I-5 North Coast Corridor Project. Consistent with state legislation,

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
			railroad project footprint area of potential effects and concluded that those resources were not eligible for listing in the National Register of Historic Places and no adverse effect to historic properties would result.	improvements to I-5 bridge crossing and LOSSAN rail bridged in San Elijo lagoon must be performed at the same time.
San Elijo Nature Center	County of San Diego	Building Structure	The two-story facility at the San Elijo Lagoon Ecological Reserve serves as a base for education, land stewardship, and environmental protection. It is constructed of recycled building materials and features solar panels, irrigated roof plants, and recycled water.	Construction completed 2009.
U.S. Army Corps of Engineers				
Encinitas-Solana Beach Coastal Storm Damage Reduction and Beach Nourishment Project	Encinitas/Solana Beach	Shoreline Protection/Sand Nourishment	The purpose of this project is to effectively reduce risks to public safety and economic damages associated with bluff erosion and to restore beaches along the shorelines of the cities of Encinitas and Solana Beach. The Solana Beach–Encinitas shoreline study area examines two segments: Segment 1 is within the city limits of Encinitas and extends from Daphne Street to H Street; Segment 2 is the majority of the beach within the city limits of Solana Beach, approximately 7,200 feet long extending from the southern city limits north to Tide Park, close to the northern city limits of Solana Beach. The recommended plan is composed of beach nourishment of a 100-foot-wide beach for the City of Encinitas with renourishment cycles every 5 years and a 200-foot-wide beach for the City of Solana Beach with renourishment cycles every 13 years. The recommended plan would result in initial and maintenance placements of sand of 340,000 cy and 220,000 cy, respectively, at Encinitas and 700,000 cy and 290,000, respectively, at Solana Beach. Sand would be dredged from offshore, beyond the depth of closure, using borrow sites designated as SO-5, MB-1, and SO-6. That material would then be placed directly onto the two receiver sites within Encinitas and Solana Beach. Beaches would be replenished periodically over 40-year life span to maintain selected beach width.	EIS/EIR issued in December 2012. Based on alternative chosen, project implementation could occur from 2015 through 2060. The Final EIS/EIR was issued on May 22, 2015, for public review. In April 2015, the Army Corps Civil Works Board approved the Storm Damage Protection Project for construction in 2018 (Meyerhoff 2015). California Coastal Commission approval received on November 14, 2013. Federal funding needed to implement and not available at this time. If material from lagoon restoration were placed on Project receiver sites, then the storm damage reduction project would not place additional sand concurrently. The two projects would not be additive, although given the lack of federal funding, it is highly unlikely the shoreline project would be implemented in the time period of the SELRP.
Encinitas				
Sand Compatibility and Opportunistic Use Program (SCOUP)	Encinitas	Opportunistic Sand Nourishment Program	This city program authorizes deposition of sand adjacent to Batiquitos Beach and Moonlight Beach at an annual maximum of 120,000 cy and 150,000 cy, respectively. Incidental project implemented as described below.	Mitigated Negative Declaration (MND) completed. Approved for period 2010–2015. Permitting and CEQA ongoing to expand program and add two more receiver sites (Leucadia and Cardiff). MND prepared.
Moonlight Beach Sand Replenishment	Encinitas	Annual Sand Nourishment	The City of Encinitas imports sand annually to Moonlight Beach to augment the naturally occurring sand at the beach. This program imports approximately 1,000 cy of sand in the spring from inland sand-borrow areas for placement on the upland portion of the beach. Sand is trucked in, placed in an area above the mean high tide line, and spread across the back beach.	Approved; occurs annually in May since 2000.
Scripps Memorial Hospital – Parking Lot Removal	Encinitas	Development/Opportunistic Sand Nourishment Project	Approximately 5,000 cy of sand was dispersed at intertidal portions of Moonlight Beach from this upland development project, which consisted of the construction of a multi-story parking garage at Scripps Memorial Hospital. This sand placement project was authorized under the City's SCOUP.	Completed March 2010.
Pacific Station	Encinitas	Development/Opportunistic Sand Nourishment Project	Approximately 37,000 cy of sand was placed on Batiquitos Beach as part of the construction of a mixed-use development at 687 South Coast Highway 101, in downtown Encinitas. Export material was generated from a two-story underground parking garage.	Completed 2009.
San Elijo Lagoon Mouth Opening	Encinitas	Maintenance Dredging/Sand Placement	This project excavates sediment from the mouth of San Elijo Lagoon to maintain the opening and places the cobble and sand material south of the mouth on Cardiff Beach. An average of 20,000 cy is bypassed (sand entering lagoon from alongshore transport from north of the inlet is placed on beach south of the inlet) from the lagoon per event.	Opening generally occurs twice annually on an as-needed basis.

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
Encinitas Resorts Hotel	Encinitas	Development/Opportunistic Sand Nourishment Project	This project placed material excavated from a hotel project on the beach at Leucadia.	Completed 2009.
San Elijo Joint Powers Authority (JPA) Recycled Water Expansion Improvement Project	Encinitas	Wastewater Infrastructure	The project created an additional 600 acre-feet per year of new water supply; improved water quality, reliability and operational efficiency of the recycled water produced at the facility; added treatment to allow the facility to accept and treat urban runoff; and created new opportunities to protect coastal water quality. Project improvements included (1) constructing 0.5 mgd of advanced wastewater treatment, (2) converting an existing tank to store recycled water, (3) constructing a new recycled water distribution pumping station, (4) converting existing tanks to store treated wastewater from the Escondido Land Outfall for emergency outfall pressure equalization, and (5) constructing new distribution pipelines to serve additional customers. The original project was modified to include stormwater diversion and microfiltration and reverse osmosis to remove salts so the water could be recycled.	San Elijo JPA approved the project on 12/14/2009. An MND was finalized and the Notice of Determination was dated 2/14/2011. The project is completed.
San Elijo State Beach Replace Lifeguard Headquarters	Encinitas	Parks and Recreation	This project would replace an existing lifeguard headquarters located on a bluff at the southern end of San Elijo State Beach. A replacement lifeguard headquarters facility, consisting of a replacement observation tower and a lifeguard support facility, was proposed in a location that would not be endangered by the bluff erosion but would maintain the current level of visual monitoring for the beach and ocean below and enhance support for lifeguard activities that are currently supplied by other facilities located in Encinitas.	Final MND – no significant environmental effects – 12/28/2006. Awaiting Coastal Development Permit.
Moonlight State Beach Improvement Project	Encinitas	Parks and Recreation	This project includes removing the existing restroom and concession buildings resulting in an increase of beach sand area; adding a combined restroom/concession building totaling approximately 3,600 square feet located at the bottom of the parking lot; and constructing a garage/public overlook building totaling approximately 950 square feet located at the bottom of the C street cul-de-sac. The garage would be used for parking lifeguard trucks, storage containers, and rescue equipment. The top of the garage would serve as a public overlook area.	Construction began fall 2012 and was completed in June 2013.
Moonlight State Beach Lifeguard Tower Construction	Encinitas	Parks and Recreation	Project would replace the existing Moonlight State Beach lifeguard tower with a new facility in the same location. Anticipated plans include 2,200-square-foot structure that would house administration of lifeguard division, first aid station, dispatch station, and workspace for Sheriff's Department. Funding was secured in 2014 for the project.	Environmental documentation process beginning. Construction anticipated in late 2015 or 2016.
Sewer Force Main Replacement	Encinitas	Wastewater Infrastructure	Olivenhain Sewer Force Main Replacement along Manchester Avenue from the San Elijo JPA Water Reclamation Facility to the Olivenhain Sewer Pump Station at the Manchester Avenue/I-5 Interchange. Also, Highway 101 Sewer Force Main replacement at the existing bridge across the San Elijo Lagoon mouth on Highway 101.	Completed 2013.
Olivenhain Trunk Sewer Project	Encinitas	Wastewater Infrastructure	Project involves rehabilitation of or replacement of 54 manholes along the Olivenhain Trunk Sewer, and replacing approximately 2,500 feet of sewer line at the upstream end of the Olivenhain Trunk Sewer and moving it out of Escondido Creek and onto City streets.	Environmental documenation process ongoing. Project completion anticiated 2017.
Solana Beach				
Opportunistic Beach Fill Program (SCOUP)\	Solana Beach	Opportunistic Sand Nourishment Program	For Solana Beach, this program authorizes the deposition of sand at Fletcher Cove at an annual maximum of 150,000 cy. No materials placement has occurred or is planned.	Approved for 5-year period 2008–2013. Permits extended for 5 years.
Fletcher Cove Reef Project	Solana Beach	Shoreline Protection	The Corps and the City of Solana Beach are working together to develop the conceptual engineering design for a multipurpose offshore submerged reef located near Fletcher Cove. The primary goal of the reef would be to retain sand to create a wider beach and improve the efficacy of beach nourishment projects.	Conceptual engineering and design completed; Phase II engineering design and environmental review not initiated.
Gateway Park	Solana Beach	Park and Recreation	Purchase of a 3.44-acre parcel, known as the Gateway Property, on the east side of Scenic Highway 101 at the north end of Solana Beach across the highway from Cardiff State Beach for preservation and incorporation in the San Elijo Lagoon Ecological Reserve.	In December 2011, San Elijo Lagoon Conservancy purchased the Gateway Property. Ongoing fundraising for park development.
Fletcher Cove Community Center	Solana Beach	Development	This project includes full refurbishment and accessibility improvements to the existing community center located on a 1-acre site above Fletcher Cove Park.	Construction started 2010; project completed in 2012.
Highway 101 Westside Improvement Project	Solana Beach	Pedestrian/Bicycle Circulation	This project is a pedestrian and bicycle circulation improvement project to promote traffic calming, safe pedestrian mobility, and business vitality in the Highway 101 corridor in Solana Beach. Highway 101 would remain a four-lane roadway after completion of these improvements. The project's extents are between Dahlia Drive and Cliff Street.	Completed in 2013.
Lagoon Restoration Projects				
Buena Vista Lagoon Enhancement Project	Oceanside, Carlsbad	Lagoon Enhancement	Conservation efforts have been ongoing since the 1980s. The Buena Vista Lagoon Enhancement Project (previously referred to as the Buena Vista Lagoon Restoration Project) would enhance approximately 200 acres of wetland habitat at the lagoon. Project goals include: • Create a self-sustaining ecosystem to ensure long-term environmental viability, while incorporating a manageable amount of monitoring and maintenance; • Create a functional ecosystem for nesting, wintering, and year-round foraging of native, migratory, and special-status species; • Maintain existing sensitive habitats and native species diversity while attracting as many naturally occurring species as can be reasonably sustained;	Ongoing enhancement planning; NOP issued May 2014. Draft CEQA document not yet issued. Alternatives identified in the NOP included freshwater system, salt water system and hybrid system. Enhancement of this lagoon is one of two options identified in the I-5 North Coast Corridor PWP/TREP.

Project Name	General Location/Jurisdiction	Project Type	Description	Project Status/Schedule
			• Create conditions that curtail the growth and expansion of exotic species; and • Incorporate appropriate and compatible public uses such as viewing sites, trails, and signage. SANDAG is serving as the lead agency in current Buena Vista Lagoon enhancement planning efforts.	
Batiquitos Lagoon Restoration Project	Carlsbad	Lagoon Restoration	In 1987, the Port of Los Angeles, City of Carlsbad, U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Wildlife (CDFW), and State Lands Commission signed an agreement toward implementing the restoration of Batiquitos Lagoon. The restoration would serve as mitigation for loss of marine resources in the Outer Los Angeles harbor due to Port construction activities. Restoration began in March 1994 and, in December 1996, the restoration was completed when the mouth of the lagoon was opened to reestablish continuous tidal flushing. A long-term monitoring program was required for 10 years following the construction period. CDFW manages the lagoon using maintenance funds provided by the Port of Los Angeles.	Complete, restoration began in March 1994 and continued through December 1996.
Batiquitos Lagoon Ongoing Dredging	California Department of Fish and Wildlife	Lagoon Maintenance	CDFW maintains Batiquitos Lagoon through an ongoing dredging program to remove sediment and open the inlet, approximately every 3 years.	Ongoing. Dredging took place in late 2011 through early 2012.
San Dieguito Lagoon Restoration Project	Del Mar	Lagoon Restoration	The San Dieguito Wetlands Restoration Project revitalized 150 acres of coastal wetlands, creating a fish nursery and a refuge for migratory water fowl and endangered species. The project restored tidal flows, natural habitat, and vegetation. Further restoration activities, referred to as the San Dieguito Lagoon W-19 Restoration Project (NOP released 8/27/14), have been proposed by Caltrans/SANDAG as mitigation for the North Coast Corridor and the El Camino Real Bridge projects. The proposed project will create more than 50 acres of salt marsh and more than 15 acres of freshwater marsh suitable for light-footed Ridgway's rail.	Completed in 2011, being monitoring for 40 years. Grading refinements implemented in 2014 to reduce elevations west of I-5 and improve wetland function. Additional restoration activities, referred to as the San Dieguito Lagoon W-19 Restoration Project, are expected to begin construction in 2017.

Beach quality material generated by the SELRP would be transferred to the Corps and cities for placement as part of the Storm Damage Reduction Project. They would then reduce the quantity of beach quality material to be dredged and transported to those same sites. The total volume of material would be consistent with the Storm Damage Reduction Project. Impacts associated with placement of material at the proposed Storm Damage Reduction Project sites are addressed in the CEQA/NEPA document prepared for that project.

5.3 CUMULATIVE IMPACT ANALYSIS

To ensure a conservative analysis that accurately reflects "worst-case" cumulative impacts, impacts from all three of the alternatives for the SELRP were considered for potential contributions to cumulative impacts. Differences between alternatives in terms of contribution to cumulative impacts are called out when applicable; otherwise, the impacts are assumed the same across all alternatives.

5.3.1 LAND USE/RECREATION

Section 3.1 identifies no significant land use impacts as a result of activities associated with lagoon restoration or materials disposal/reuse for any of the proposed alternatives as the majority of the project study area would generally maintain its current land use; would not create incompatible land uses; and would not be inconsistent with regulatory policies. Many of the projects on the cumulative project list involve sand nourishment and beach replenishment projects that would also not create land use conflicts as they would be placing sand onto existing beach areas and would not substantially modify the land use of an area or create a new incompatible use. Additionally, many land use plans encourage beach replenishment. Other cumulative projects, such as infrastructure improvements, are not generally of the nature to result in significant land use conflicts or incompatibilities and would improve or upgrade existing infrastructure such as I-5 or the railway corridor. Cumulative projects within the lagoon area would not conflict with coastal access policies as the I-5 North Coast Corridor Project includes trail enhancements and there is currently no pedestrian access for crossing the railroad within the lagoon that could be impacted by the LOSSAN double-tracking project.

For these reasons, the project would not make a cumulatively considerable contribution to a direct or indirect adverse significant cumulative impact related to land use. A less than significant cumulative impact would occur.

Beach nourishment projects on the cumulative list might result in temporary recreational impacts to surfing, beach-going, and other water sports due to restricted areas or access for safety purposes while material is physically placed on the beach areas. However, these recreational impacts would be short term and the overall result would include improved recreational opportunities due to the increased volume of sand and available beach area. The sand nourishment projects have varying implementation timeframes and would not all occur at the same time, leaving ample local beach recreation areas available while project-related restrictions may be in place at other locations.

Some cumulative projects would also serve to enhance the recreational opportunities and value of the lagoon and immediately surrounding areas. As part of the I-5 North Coast Corridor Project, Caltrans would construct an enhanced trail connection on the west side of the widened I-5 bridge over San Elijo Lagoon consisting of a suspended pedestrian walkway structure. It would complement and connect the existing trail system in the lagoon. Additionally, the Final I-5 North Coast Corridor EIR/EIS states in the land use section that access to existing trailheads and designated trails in the Reserve would be unaffected (Caltrans 2013). Further, the coastal access enhancements defined in the PWP/TREP would be implemented if the I-5 North Coast Corridor and LOSSAN projects are permitted and constructed. While there may be short-term closures/changes to individual trails, specific beach access points, or temporary road closures or detours requiring modified recreation access, the overall recreation opportunities will be increased. The proposed Gateway Park project adjacent to the south of the lagoon could provide new trails, sitting areas, and a vantage point for wildlife watching. Alternative 1B of the SELRP would also allow for an additional trail within the central basin to complete the existing trail loop between the Nature Center and NCTD access road. Additionally, two cumulative projects at local beaches, San Elijo State Beach and Moonlight State Beach, would replace lifeguard facilities and improve beach amenities.

For these reasons, the temporary restrictions and interruptions to recreational opportunities that would result from the proposed project would not make a cumulatively considerable contribution to a direct or indirect adverse significant cumulative impact related to recreation. Long-term beneficial impacts would result from the proposed project and other cumulative projects. A less than significant cumulative impact would result.

5.3.2 HYDROLOGY

While Section 3.2 identifies an increase in potential flood levels as a result of the project, less than significant permanent or temporary adverse impacts to hydrology would result from implementation of any of the project alternatives. The proposed project would substantially change some of the lagoon’s hydrology and tributary drainage patterns (varying in degree by alternative); however, the design-induced changes would cause a net beneficial impact to the hydrology by improving overall circulation with, and improved drainage pathways to, the ocean.

It is possible that other cumulative projects, specifically projects that require substantial earth-moving or surface alterations, or projects that increase impervious surface area such as the I-5 North Coast Corridor Project, could also change and modify local hydrology. However, other cumulative projects would be required to adhere to all federal, state, and local regulatory requirements, and may include preparation of a SWPPP and implementation of BMPs to minimize impacts on surface drainage patterns, the amount of surface runoff, and the exposure of people or property to water-related hazards such as flooding. These regulations and requirements would further aid in minimizing the potential for project impacts that could combine to create cumulative hydrology impacts.

For these reasons, the project would not make a cumulatively considerable contribution to a direct or indirect adverse significant cumulative impact related to hydrology. Long-term beneficial hydrological effects would result in the cumulative scenario. A less than significant cumulative impact would occur.

5.3.3 OCEANOGRAPHY/COASTAL PROCESSES

Project analysis found that less than significant impacts would result from any of the alternatives to littoral processes, sand erosion rates, risk of damage to coastal structures, and coastal wetlands during either the lagoon restoration process or the materials disposal/reuse. Additionally, for Alternative 2A and Alternative 1B, beneficial impacts would result due to onshore materials placement because of reduced risks of damage to coastal structures.

The majority of cumulative projects that would not include sand nourishment activities or other types of onshore or offshore materials removal or placement would not have any effect on coastal processes. However, multiple projects on the cumulative list are sand nourishment projects. The materials deposited on the neighboring beaches from other beach nourishment projects would add sand to the littoral cell in the vicinity of the project area, which could impact littoral processes. However, these sand nourishment projects are generally undertaken to bypass sand that has been temporarily removed from the littoral cell and trapped in locations such as within Oceanside Harbor or the various coastal lagoons. The replenishment of beach sand from the bypass projects can be considered as a cyclic redistribution of sand within the littoral cell and is not anticipated to result in adverse effects to littoral and coastal processes. Larger projects, such as the 2001 and 2012 RBSPs, supply the system because there is no longer an adequate supply of sediment from historic sources (upstream erosion, bluff erosion, etc.). Sand supplies from larger projects eventually distribute throughout the system and exit to canyons and outside depths of closure such that no long-term adverse cumulative effects occur. Additionally, cumulative sand nourishment projects throughout the region would not substantially reduce the 30-mcy deficit identified for the region (SANDAG 2011). Similar to the discussion of the proposed project, onshore beach nourishment resulting from cumulative projects would be beneficial in reducing risks from wave and storm erosion to coastal geology and structures.

For these reasons, the proposed project would not make a cumulatively considerable contribution to a cumulatively significant direct or indirect adverse impact related to coastal processes under any alternative. Some beneficial impacts would result from the onshore material placement as part of the proposed project and other cumulative beach nourishment projects specific to increased protection of coastal geology and structures. A less than significant cumulative impact would result.

5.3.4 WATER AND AQUATIC SEDIMENT QUALITY

As detailed in Section 3.4, the proposed project or alternatives would not create significant impacts to water or sediment quality because a variety of appropriate BMPs would protect water quality, minimize erosion, and minimize sediment transport during construction. Turbidity plumes may result from materials placement in offshore and nearshore locations, but would settle quickly. However, the potential water quality impacts associated with temporary turbidity due to dredging activities are considered potentially significant as the lagoon is a 303d listed water body. Mitigation, project design features, and regulatory requirements would serve to minimize potential turbidity effects. The proposed project and alternatives would provide a long-term water quality improvement (to varying degrees dependent on alternative) throughout the lagoon by increasing tidal exchange, which would improve lagoon circulation, decrease stagnation, and increase lagoon and coastal water quality. Beneficial improvements have already occurred at San Dieguito Lagoon and may occur at Buena Vista Lagoon if enhancement proceeds.

Water quality and hydrology impacts can have widespread effects to an entire watershed, hydrologic unit, and downstream locations. For this reason, analysis of potential cumulative impacts to water quality must also consider development and projects that are occurring at upstream locations in the watershed. Many of the projects on the cumulative project list, such as beach nourishment and other smaller projects, would not be of the type or magnitude to create significant water quality impacts. Some projects, such as the Olivenhain Trunk Sewer Project, would make improvements to existing infrastructure to minimize the potential for local wastewater spills to affect lagoon water quality. However, larger projects, such as the I-5 North Coast Corridor project, LOSSAN project, or other large developments within the watershed, could result in degraded water quality. As described in Section 3.4, multiple federal, state, and local regulations must be complied with to protect water quality. Typically, projects under the Construction General Permit would be required to prepare a SWPPP that identifies BMPs that would be used to prevent pollutant discharge and minimize other water quality impacts. Additionally, projects would be implemented in accordance with RWQCB water quality certifications, which require compliance with applicable water quality standards, limitations, and restrictions. The required adherence to water quality regulations and implementation of required BMPs would minimize the potential for water quality impacts to result from cumulative projects and development throughout the watershed.

Turbidity plumes associated with materials placement under Alternative 2A or Alternative 1B would not be expected to overlap with other areas of turbidity caused by cumulative sand nourishment projects. The proposed project turbidity plumes would be temporary, settle quickly, and be fairly localized. It is unlikely that cumulative sand nourishment projects that create temporary nearshore turbidity would be ongoing in the immediate vicinity at the same time as the proposed project and would be subject to dispersion and dilution by ambient currents, wind, and wave action.

For these reasons, the proposed project would not make a cumulatively considerable contribution to a direct or indirect cumulatively significant adverse impact related to water quality under any alternative. Some beneficial impacts would result to water quality (most substantially under Alternative 2A) due to increased circulation and tidal exchange. A less than significant cumulative impact would result.

5.3.5 GEOLOGY/SOILS

Project removal and or placement of sediment and other material from the generally flat lagoon basins or the previously disturbed access roads and staging areas would not occur in locations that provide stability for other natural features, such as slopes or hillsides, and would not create increased geologic hazards as described in Section 3.5 for any of the alternatives.

Offshore and nearshore placement of materials is considered to have no geologic or soils impacts. The placement of sand at onshore locations (Alternative 2A and Alternative 1B) would not cause geologic hazards and may actually reduce the potential for geologic hazards as it would serve to protect against the undercutting or erosion of cliffs or other areas subject to wave-induced erosion, thus resulting in the beneficial outcome of reducing slope instability and landslide potential. There would be positive geologic results for the cumulative sand nourishment projects included on the cumulative list.

Construction of a new Coast Highway 101 bridge would potentially occur within soil types subject to liquefaction, erosion, settlement, or other unstable geologic conditions, and would require mitigation including geotechnical investigations and implementation of site-specific measures recommended in the engineering study to ensure appropriate design for structural stability and reducing unstable geologic conditions. The channel under the new I-5 bridge planned by Caltrans would require substantial deepening for improved hydraulics, and a new railroad bridge structure would be constructed by NCTD with a channel extending beneath it as part of the LOSSAN double-tracking project. Multiple regulatory codes and requirements would apply to ensure structures are properly designed and engineered to achieve high safety standards when being constructed in unstable geologic conditions. Similar to the SELRP, the implementing agencies for these bridge projects would be required to perform necessary geologic investigations and meet engineering and design requirements to ensure appropriate design for geologic safety. Adhering to regulations and requirements aid in minimizing the potential for project impacts that could combine to create cumulative geologic and soils impacts.

For these reasons, the activities associated with lagoon restoration and materials placement under any of the alternatives would not increase geologic hazards. **Thus, the proposed project would not make a cumulatively considerable contribution to a cumulatively significant adverse impact related to geology and soils. A less than significant cumulative impact would result.**

5.3.6 BIOLOGICAL RESOURCES

Because the biological resources specific to the lagoon are unique and specialized, lagoon restoration is discussed under a separate heading from the on-site materials placement sites.

Lagoon Restoration

A limited number of lagoon resources are located throughout the San Diego coastline, including Buena Vista, Agua Hedionda, Batiquitos, San Elijo, San Dieguito, and Los Peñasquitos lagoons. Because lagoon resources are specific to specialized conditions of each lagoon, the cumulative analysis for this project focuses on projects that might have the potential to impact biological resources also associated with San Elijo Lagoon.

As described in Section 3.6, restoration construction would result in greater than 50 percent temporal loss of sensitive habitats that would be significantly impacted by construction activities, including coastal salt marsh (low- and mid-), open water, saltpan/open water, and tidal mudflats and is considered a short-term significant and adverse direct impact to these types of habitats. Because the SELRP would closely coincide with other cumulative projects occurring within the lagoon area, such as the I-5 North Coast Corridor and LOSSAN double-tracking projects, sensitive lagoon habitats could be further impacted. **This is considered a short-term significant and adverse cumulative impact.** However, the temporary loss of the habitat within the lagoon is unmitigable as it must occur for the restoration activities to take place. As detailed in Section 3.6.4, additional mitigation measures to lessen impacts were considered but found to be infeasible at the project level and there are also no additional feasible mitigation measures available to lessen the cumulative impact. It is not possible to further reduce biological impacts through timing or phasing considerations with other in-lagoon cumulative projects due to requirements for concurrent construction as mandated by the Kehoe Bill. The potential for receiving recovery after all three are constructed is greater given the simultaneous construction, shortening the overall duration. This short-term cumulative impact would cease over time as the habitats are restored and beneficial habitat impacts would result from the enhanced and restored lagoon function.

The San Dieguito and Buena Vista lagoon restoration projects have the potential, when considered cumulatively with the SELRP, to result in temporary cumulative habitat losses should the project schedules overlap. Of issue is the loss of foraging, nesting or over-wintering habitat as part of the relatively limited coastal wetlands in southern California. Long-term, all three projects could serve to improve the ecology (functions and values) of these critical lagoon resources. When considering the potential for short-term impacts, it is important to consider the timing, along with the resources.

The San Dieguito project completed restoration in 2011, but in early 2014, a portion of the site was re-graded as part of the on-going adaptive management plan for the project. The Project created/restored salt marsh, mudflat, subtidal and upland habitats, and fisheries resources, on what was most recently farmed and upland habitat. It created more than 100 acres of coastal wetlands that is already functioning for the intended fish resources, and many birds as well. While vegetation at San Dieguito will likely not be fully established prior to the SELRP implementation, habitat will already be of higher biological resource value than the pre-project condition and will be available for migratory birds seeking stop-over habitats. Therefore, no cumulative temporal impacts are anticipated when considered with this project.

There is no known implementation date for Buena Vista Lagoon restoration. Funding restrictions make it unlikely that project construction would overlap with the SELRP. It is possible that any restoration activities at Buena Vista Lagoon could occur after SELRP installation but during the subsequent maintenance and monitoring period. Buena Vista Lagoon currently consists of predominantly freshwater and open water habitats, and although several alternatives are being considered for the restoration project (freshwater, saltwater, and hybrid), Buena Vista Lagoon currently supports a different habitat mix than those that would be impacted by the SELRP. San Elijo Lagoon does support freshwater habitats in the east basin; however, project construction would affect a limited amount of freshwater habitats areas relative to the entire lagoon, consisting predominantly of brackish marsh. After full tidal opening at San Elijo Lagoon, it is possible that increased tidal flow may result in the conversion of additional habitat away from freshwater/brackish marsh. However, this is anticipated to be limited to the transitional monitoring area above the restored high water elevation.

If Buena Vista Lagoon is restored to a saltwater habitat mix, a reduction in freshwater habitats would result. However, the limited transition of freshwater habitat at San Elijo Lagoon would not be cumulatively considerable when considered with the restoration of Buena Vista Lagoon, for the following reasons: (1) Conversion of one habitat type to another is not in itself a significant biological impact, as the restoration of degraded habitat (regardless of type) would be ecologically beneficial to sensitive species and the lagoon ecosystem as a whole. (2) Saltwater habitats that would be created at San Elijo Lagoon are regionally far more limited than freshwater marsh habitats (3) Sensitive species relying on freshwater habitats within San Elijo Lagoon are not expected to be significantly impacted by the transition (e.g., light-footed Ridgway's rail currently living in the east basin is expected to transition to newly restored low marsh habitats). (4) Habitat impacts at San Elijo Lagoon would be limited in acreage, and the majority of freshwater wetland habitats at San Elijo Lagoon would remain available for resident and migratory species. Therefore, no cumulative significant impacts are anticipated.

Belding's savannah sparrow is a year-round resident of the lagoon and would experience temporary loss of greater than 50 percent of their nesting habitat. This sensitive bird species has the potential to be further disturbed or impacted by other cumulative projects such as the I-5 North Coast Corridor and LOSSAN double-tracking projects taking place in the lagoon or near the lagoon, such as the Olivenhain Trunk Sewer Project, within a similar timeframe. It is likely that those cumulative projects would not impact habitat at the same magnitude as the SELRP as they would be generally more localized, **but the cumulative impacts to Belding's savannah sparrow would be significant and adverse in the short term.** As detailed in Section 3.6.4, additional mitigation measures to lessen impacts were considered but found to be infeasible at the project level and there is also no feasible mitigation at the cumulative level available to reduce this cumulative impact as the loss of nesting habitat must occur for project implemention to take place within the lagoon.

The proposed project results in the potential for short-term noise impacts to sensitive species as a result of construction activities. When in proximity to wildlife, the effects of dredge and other construction noise may disrupt foraging or breeding behavior of sensitive birds. The dredge is slow and would be operating in one basin at a time; as such, birds could always relocate to quieter habitat. However, relocation during the breeding season is not feasible for nesting birds and this is considered a significant and unavoidable impact. If the I-5 North Coast Corridor Project or LOSSAN double-tracking project were to occur simultaneously and in proximity to the active dredging footprint, it is possible that ambient noise levels would increase to even higher levels. The lagoon restoration dredging activities would play a substantial role in these increased noise levels.

Multiple mitigation options were considered to reduce noise levels that may impact nesting birds during breeding seasons; however, none were found feasible. The use of an electric dredge was considered but eliminated as a noneffective option as the noise levels from an electric dredge compared to diesel dredge do not substantially differ. The use of noise walls was also eliminated as a feasible mitigation option for reasons including habitat concerns that would result from the long-term placement of a noise wall and the substantial length of the noise wall that would be required because the dredge would be moving. A mitigation measure limiting work to outside the breeding season was also considered. However, this would extend the overall construction duration from 2 years to 4 years, prolong the overall period of disruption to foraging birds to 4 years, and add at least 2 years for habitat recovery. This was determined to be biologically undesirable and therefore infeasible. **For this reason, implementation of any project alternative, with the exception of the No Project/No Federal Action Alternative, could make a cumulatively considerable contribution to an adverse temporary significant cumulative biological impact due to noise effects on sensitive birds.** As detailed above and in Section 3.6.4, mitigation measures were considered but found to be infeasible at the project level and no additional feasible cumulative mitigation measures beyond those described above have been identified to reduce cumulative noise impacts.

Multiple cumulative projects that could also include construction are located within the lagoon itself and therefore have the potential to adversely impact sensitive biological resources. Adverse biological impacts resulting from cumulative projects could include the disturbance of sensitive vegetation communities, habitat loss, impacts to nesting and/or foraging habitat of sensitive animal species, restrictions to wildlife movement, degraded water quality, and others. These projects would be subject to all federal, state, and local regulations regarding the avoidance, protection, and mitigation of adverse impacts to biological resources. While some similar adverse short-term biological impacts would occur with the proposed lagoon restoration, they are not considered to combine with other cumulative projects to create a significant adverse impact because they would cease over time as habitats establish. In addition, the SELRP would not have a considerable contribution to long-term cumulative impacts because of the overall positive beneficial biological results that would occur from the construction of this proposed project. The proposed project would result in improved hydrologic function, increased foraging habitat, and reversal of the rapid habitat changes occurring under existing conditions. The addition of cumulative projects and their potentially adverse impacts on biological resources would not reduce the proposed project's ability to create improved lagoon ecology, or increase foraging for species, and would result in no overall loss of lagoon resources. The SELRP is, by design, a project for the long-term improvement of water quality and health/diversity of biological resources. **For these reasons, the proposed project would not make a cumulatively considerable contribution to a long-term direct or indirect cumulatively significant adverse**

impact related to the overall loss of biological resources. A less than significant cumulative impact would result.

Materials Disposal/Reuse

There are no known cumulative projects proposing offshore disposal, and disposal at LA-5 is limited to a specific volume controlled by EPA; thus, that topic is not discussed further. As noted in the list of cumulative projects, multiple beach placement/nourishment projects could occur along the San Diego coastline and at overlapping onshore locations as proposed by the SELRP. Of the listed cumulative projects, only those involving beach placement/nourishment or associated with the ocean environment have the potential to contribute to cumulative impacts to nearshore and offshore biological resources. It is not reasonable to assume that onshore materials placement would occur simultaneously in areas of immediate proximity, but rather would be coordinated and occur at separated locations along the coast. The Encinitas-Solana Beach Coastal Storm Damage Reduction Project is anticipated to be implemented in 2015; however it identifies the possibility that materials from the SELRP may be substituted or supplement sand for beach nourishment proposed as part of that project rather than being an additional volume of material placed in the system (Corps 2012). Volumes placed as part of the SELRP would therefore not be considered cumulatively with that project. Additionally, marine impacts from onshore or nearshore material placement are typically temporary and localized, and dissipate rapidly with ambient conditions returning quickly. The largest of past sand nourishment projects, the 2012 RBSP, was completed and is in the monitoring phase. Thus, the potential for many cumulative adverse impacts, such as increased turbidity, aquatic wildlife displacement, and other potential biological impacts, would likely not combine as these impacts would have ceased prior to implementation of the SELRP. Other cumulative beach nourishment projects are of a much lesser volume, resulting in even lesser potential for impacts to combine in a cumulative manner. These projects would also be subject to all federal, state, and local regulations regarding the avoidance, protection, and mitigation of biological resources. Environmental documents, such as those for the 2012 RBSP and the Encinitas-Solana Beach Coastal Storm Damage Reduction Project, found that no significant cumulative biological impacts were anticipated from the projects. Overall, Alternative 2A or Alternative 1B, in combination with cumulative beach nourishment projects, would enhance sandy beach habitat to the benefit of numerous species. The potential for cumulative impacts to sensitive nearshore habitat areas due to increased material in the coastal process is anticipated to be less than significant based on project model predictions**. For these reasons, Alternative 2A or Alternative 1B of the proposed project would not make a cumulatively considerable contribution to a direct or indirect significant adverse cumulative biological impact during onshore or nearshore materials placement. A less than significant cumulative impact would result.**

5.3.7 CULTURAL RESOURCES

Section 3.7 identifies potential significant CEQA impacts to cultural resources under Alternative 2A because the bridge/inlet areas of excavation would be in locations with the possibility for buried unknown cultural resources to be present, and because of the known presence of previously recorded cultural resources in the immediate proximity to the lagoon study area. CEQA mitigation is proposed that would provide for the identification and monitoring of areas with the potential to contain intact cultural resource deposits, and, if necessary, the recovery, curation, and documentation of any resources identified on a DPR form and in CEQA/NEPA technical report. Mitigation and regulatory requirements would require that work be suspended or redirected if human remains were encountered and would also include consultation with local Native American Tribes per CEQA and Section 106 and a protocol for handling the inadvertent discovery of human remains. In accordance with Corps special conditions, all work in the area of the resource would stop until the necessary consultations are completed. Work could then be reinitiated. This would ensure that any cultural resources encountered during construction would be treated in accordance with applicable regulations and guidance. If excavations became necessary because impacts to sites could not be avoided, then permanent curation of the remains would ensure that the important information was retained and documented. Additionally, Alternative 2A, Alternative 1B, and Alternative 1A could result in potential accidental disturbance to nearby cultural resources during construction use of an existing access road. Mitigation was included to require the use of exclusionary fencing to avoid inadvertent disturbance of cultural resources in proximity to the APE, staging areas, and access roads. The proposed mitigation measures would minimize/mitigate the potential for the project to add to the cumulative loss or destruction of significant cultural resources.

Other cumulative projects that involve ground-disturbance would also have the potential to impact buried cultural resources. Similar to the proposed project, these cumulative projects would also be subject to all federal, state, and local regulations mandating the protection of cultural resources. If cumulative projects identify a potential to impact cultural resources, the impact would typically be mitigated through measures such as site preservation or data recovery. These types of mitigation measures allow the cultural resources data to be protected and preserved to ensure that the critical information necessary to the future study of cultural resource sites and artifacts is not lost or destroyed by the proposed project or other cumulative projects within the study area.

Because the proposed project and cumulative projects must comply with CEQA; NEPA; and all other cultural federal, state, and local regulations, which require adequate analysis and appropriate mitigation of cultural resource impacts, the cumulative impacts to archaeological resources would be expected to be fully avoided, minimized, or mitigated through a variety of methods including those described above, and critical information regarding regional prehistory preserved and/or documented. While the entire 935-mile route of Highway 101 in California was given historic designation by the state in 1998 and is well over 50 years old, it has been widened and improved many times within the proposed project area and has a low potential to be eligible for listing in the NRHP or CRHR due to loss of integrity. Thus, the overall historic value of this roadway would not be substantially diminished due to the new bridge construction associated with Alternative 2A.

For these reasons, any alternative of the proposed project would not make a cumulatively considerable contribution to direct or indirect adverse cumulative impacts for cultural resources. A less than significant cumulative impact would result.

5.3.8 PALEONTOLOGICAL RESOURCES

As described in Section 3.8, most components of the alternatives would not require excavation that could extend to a depth that may damage or destroy paleontological resources found in highly sensitive underlying bedrock formations. However, the proposed access road along the southern boundary of the lagoon could extend into areas underlain by the highly sensitive Delmar Formation that occurs at or near the surface in the area, so excavation of any depth may have the potential to impact paleontological resources. Thus, per CEQA, these shallow grading activities may disturb the underlying sensitive formation, resulting in a potential for paleontological resources to be damaged or destroyed. Required CEQA mitigation would include monitoring during grading, trenching, or other excavation into undisturbed rock and sediment layers beneath the soil horizons with a fossil recovery program and Paleontological Resource Mitigation Report. This would ensure that any paleontological resources encountered during construction would be adequately treated and the important information retained and documented. This would minimize/mitigate the potential for the project to add to the cumulative loss or destruction of significant paleontological resources. Placement of materials on either the ocean floor or beach areas would also not impact paleontological resources found in underlying parent material. **The alternatives would not make a cumulatively considerable contribution to a cumulatively significant direct or indirect adverse impact related to paleontology. A less than significant cumulative impact would result.**

5.3.9 VISUAL RESOURCES

Section 3.9 identified temporary significant impacts as a result of construction activities under Alternative 2A and Alternative 1B because the visual character of the project site would change substantially from existing conditions due to vegetation removal from a large portion of the central basin, substantial landform alteration, construction equipment in atypical locations, and some outdoor lighting. Additionally, a long-term visual impact associated with the inlet/CBF under Alternative 2A is considered significant and unavoidable. The new inlet and CBFs would introduce a highly visible man-made, linear feature perpendicular to Highway 101 and the contrast to the current beach character would be strong for highly sensitive beach users.

When analyzing cumulative visual impacts, it is important to consider those projects that could alter the existing visual environment with the same viewshed as the project. Other cumulative projects, such as the I-5 North Coast Corridor and LOSSAN double-tracking projects could add to the short-term temporary construction visual impacts within the lagoon. These other cumulative projects could contribute to the short-term visual impact by adding more construction equipment operating in the area, increasing vegetation removal, landform modifications, stockpiling, and other construction-related activities. As detailed in Section 3.9, mitigation measures, such as screening of staging areas, are available to reduce visual impacts of construction; however, due to the expansive nature of construction throughout the lagoon basin and surrounding areas, mitigation is not feasible to fully minimize the visual impacts of construction activities throughout the natural lagoon setting. These visual intrusions would last only for the duration of each project's construction period and, ultimately, the lagoon character would be returned similar to existing preconstruction conditions. The increase in habitat diversity may be even more interesting and appealing and would enhance the aesthetic effect for trail users and visitors at the Nature Center. **However, in the short term, Alternative 2A and Alternative 1B would make a cumulatively considerable contribution to a significant cumulative visual impact due to the cumulative construction projects throughout the lagoon.** As described in Section 3.9.4, at a project level there is no additional feasible mitigation that could further reduce visual impacts. There are also no additional feasible mitigation measures beyond those described above that have been identified to further reduce the cumulative visual impact.

Potential beach placement locations all have various sensitive viewers, ranging from beachgoers, residences, recreationalists, and others. Construction equipment would be temporarily visible during materials placement, typically 2 to 4 weeks and no more than 60 days. Additionally, construction equipment would be mobile and not located in one area for a long period of time as the work progresses along the shore. All potential onshore placement locations have been recipients of beach nourishment in the past and the visual occurrence of construction equipment on these beaches is not highly uncommon. Because few projects can actually be constructed on the sandy beach areas, a limited potential exists for construction of other cumulative projects to occur simultaneously in the vicinity of the materials placement operations. **Because of the short-term and continuous mobile nature of the operations, the materials placement activities would not make a cumulatively considerable contribution to a significant cumulative visual impact. A less than significant cumulative visual impact would result.**

Many of the cumulative projects in the project viewshed would have long-term positive aesthetic outcomes. For example, other cumulative beach nourishment projects typically result in positive overall visual impacts as they enhance the sandy beach aesthetic through the creation of additional sand to cover and supplement the existing beach environment. Large projects such as the I-5 North Coast Corridor project and LOSSAN rail improvements project may slightly change the look of the existing transportation facilities, but would likely not introduce substantial new modifications to the existing visual environment. For these reasons, the adverse visual change that would result from the new inlet and CBFs associated with Alternative 2A is fairly isolated and would not combine with other adverse visual impacts in the immediate area to create a significant direct or indirect adverse cumulative impact to visual resources. **In the long term, Alternative 2A, Alternative 1B, and Alternative 1A would not make a cumulatively considerable contribution to a significant cumulative visual impact due to the cumulative construction projects throughout the lagoon. A less than significant adverse cumulative visual impact would result.**

5.3.10 TRAFFIC, ACCESS, AND CIRCULATION

As outlined in Section 3.10, no long-term significant traffic impacts would result from the any of the project alternatives as the proposed project would not result in permanent generation of trips that could increase traffic volumes. However, a significant traffic impact would occur during bridge construction under Alternative 2A and bridge retrofitting activities under Alternative 1B and Alternative 1A along segments of Highway 101 and Lomas Santa Fe Drive. This impact would be temporary, lasting only the duration of the bridge construction or retrofit. The bridge construction or retrofit requires a capacity reduction of two lanes across the Highway 101 bridge. If bridge work were to occur simultaneously with other cumulative projects that either add traffic or change the traffic flow in the immediate area, such as the I-5 North Coast Corridor Project that requires lane closures or other roadway restrictions, it is possible that the resulting changes in traffic volumes and roadway capacities could combine to create greater congestion and traffic impacts. This is not foreseeable but it is not unlikely.

Mitigation measures required for Alternative 2A, Alternative 1B, and Alternative 1A include Traffic-1, which requires a traffic control plan, and Traffic-2, which would include notifying motorists of delays and suggesting earlier detour routes. Additional mitigation measures to reduce the traffic congestion were considered, but none were found to be feasible to mitigate the temporary traffic impacts due to bridge construction. Mitigation such as widening the roadway, roadway modifications, or reducing the scale of the project to generate less traffic volume was not considered feasible or appropriate due to the temporary nature of the traffic impact. **For this reason, implementation of Alternative 2A, Alternative 1B, and Alternative 1A would make a cumulatively considerable contribution to a temporary significant cumulative traffic**

impact. As described above, additional mitigation measures detailed in Section 3.10.4 were found to be infeasible at a project level. No additional feasible cumulative mitigation measures have been identified to further reduce the cumulative traffic impacts.

5.3.11 AIR QUALITY

Air quality is typically considered a regional issue, as pollutants can travel long distances, regardless of jurisdictional boundaries. For this reason, the cumulative analysis considers regional air quality throughout the SDAB. However, localized air quality impacts can also result from numerous construction projects in a small area.

The analysis in Section 3.11 found that temporary construction-related emissions would exceed the recommended levels of significance for ROG and NO_X for Alternative 2A, Alternative 1B, and Alternative 1A and construction activities could lead to a violation of an applicable air quality standard. Implementation of mitigation measures requiring reduced-emission equipment and technology would partially reduce anticipated emissions, but not to levels below the applicable thresholds. Thus, potential violations of air quality standards as a result of construction-related activities would remain significant and unavoidable for all three alternatives.

Additionally for Alternative 2A, NO_X emissions associated with ongoing operational maintenance activities would exceed the applicable mass emission threshold and result in a significant direct impact that could not be reduced to below acceptable threshold levels.

The SDAB currently meets NAAQS for all criteria air pollutants except ozone, and meets the CAAQS for all criteria air pollutants except ozone, PM_{10}, and $PM_{2.5}$. Construction and operation of cumulative projects and general growth and development throughout the region would further degrade the local air quality, as well as the air quality of the air basin. Air quality would be temporarily degraded during construction activities that occur separately or simultaneously. As shown through the cumulative project list, multiple construction projects, including those recently completed as well as projects planned for the future, could have the potential to exceed criteria emission thresholds. Similar to the proposed project, cumulative projects would also be subject to regional air quality regulations and project-specific mitigation measures would be required if thresholds were exceeded. The required adherence to air quality regulations and implementation of mitigation, if necessary, would reduce the potential for significant adverse cumulative air quality impacts to occur throughout the SDAB due to cumulative projects.

A project that produces a significant air quality impact in an area that is out of attainment is considered to significantly contribute to the cumulative air quality impact. Conversely, projects that do not exceed the threshold criteria or can be mitigated to less than criteria threshold levels are considered insignificant contributors and would not substantially add to the overall cumulative impact. **Because emission levels from all proposed project alternatives could not be mitigated such that pollutant emissions (both temporary and permanent) would be below appropriate thresholds, the proposed project would be making a cumulatively considerable contribution to a significant cumulative air quality impact**. No additional feasible mitigation measures beyond those required in Section 3.11 have been identified at either a project level or a cumulative level that would further reduce the cumulative air quality impact.

5.3.12 Noise

As detailed in Section 3.12, activities associated with the lagoon restoration and materials placement would result in temporary increased daytime noise levels in the immediate vicinity. However, none of these increased noise levels would be in violation of appropriate daytime noise thresholds and would not exceed allowable noise levels as determined by the local jurisdictions. In general, construction activities would have to occur within 100 feet of a residential property line to have the potential to exceed noise level limits.

Noise is a localized issue and potential impacts extend only as far as noise from a project is audible. For this reason, cumulative impacts would only result when two projects are in proximity and occurring concurrently. It is not reasonable to assume that an additional beach nourishment project would take place at the same time and location as materials placement from the proposed project on a proposed onshore site. However, it is possible that another cumulative project could occur during the same timeframe as lagoon dredging. The I-5 North Coast Corridor and LOSSAN double-tracking projects are examples of cumulative projects that would cross the lagoon in proximity to the proposed project and could potentially overlap with the dredging period. It is not possible to further reduce biological impacts through timing or phasing considerations with these in-lagoon cumulative projects due to requierments for concurrent construction as mandated by the Kehoe Bill.

Other cumulative projects that could occur in the vicinity of lagoon dredging activities may include the Encinitas-Solana Beach Coastal Storm Damage Reduction Project and other beach nourishment projects, Sewer Force Main Replacement, Olivenhain Trunk Sewer Project, JPA Recycled Water Expansion Improvements, improvements at San Elijo State Beach, and Gateway Park. Though other cumulative projects are anticipated to occur within the general lagoon area at some point during dredging operations, it is unlikely that the two projects would occur in such proximity to each other and also within 100 feet of a residential property line that their noise could combine and result in an exceedance of noise level thresholds. While background ambient noise levels might be temporarily increased during simultaneous construction of multiple projects, this increase is not anticipated to be above significant levels at nearby receptors. If construction of two projects were ongoing at the same time, construction managers would be working in coordination to maintain appropriate distances between active construction areas to ensure the safety of workers and equipment, which would also limit the potential for their noise to combine in excess of daytime noise limits. **Thus, the proposed project would not make a cumulatively considerable contribution to a significant cumulative daytime noise impact.**

However, due to nighttime dredging and materials placement activities, significant impacts have been identified under CEQA for the proposed project. Project design features have been incorporated to limit nighttime noise levels, but even with implementation of these measures nighttime construction outside of allowed hours would result in significant impacts. It is possible that cumulative projects in the lagoon area, such as the I-5 North Coast Corridor Project, may also require nighttime construction outside of permitted daytime hours. **Because the nighttime noise impact outside of allowed construction hours cannot be avoided and other cumulative projects may also require nighttime construction, the proposed project would be making a cumulatively considerable contribution to a significant cumulative nighttime noise impact.** Mitigation measures including noise walls and limiting dredging and materials placement activities to daytime hours were considered to reduce this impact, but rejected as described in Section 3.12.4, These measures were not feasible at a project level and no additional feasible cumulative mitigation measures have been identified to further reduce the cumulative nighttime noise impact.

5.3.13 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

As noted in Section 3.13, though minor, the overall social and economic effects of the proposed project would be beneficial. The lagoon represents a valuable coastal wetland with substantial biological and ecological resources. The alternatives proposing onshore reuse of material would provide beaches with wider and larger sand areas to provide greater recreational opportunities and opportunity for public access, enhance tourism in the region, and provide public property and infrastructure additional protection from wave action and storm events. Material disposal and reuse can cause potential for loss of resources and income for local commercial fishermen; however, no significant impacts were identified relative to these concerns.

Many of the cumulative projects also involve beach sand nourishment opportunities that would result in similar beneficial outcomes for local beaches and the associated economics of improved beach conditions. Some other cumulative projects, such as improvements at Moonlight and San Elijo State Beaches, development of Gateway Park, or trails implemented as part of the I-5 North Coast Corridor Project, would result in improved facilities and opportunities available to the general public. Other cumulative projects would also likely draw from the local labor force and provide beneficial socioeconomic results from wages and revenue. While short-term and localized impacts to recreational activities, such as surfing or diving, noise to nearby receptors, or increased traffic congestion may occur during implementation of the proposed project or cumulative projects, the long-term result would include beneficial impacts to recreation, tourism, and associated socioeconomic considerations.

Therefore, implementation of the proposed project does not contribute to a cumulative direct or indirect adverse impact to socioeconomics under any alternative.

5.3.14 Public Services and Utilities

The proposed project would not result in significant impacts to public services and utilities under any alternative. Minimal amounts of utility provision or other public services would be required for the project. The proposed project has been designed to avoid interference with existing utilities and, in the few cases where relocation of infrastructure may be required, coordination with the service provider would minimize potential for substantial service interruptions. A specific utility study in advance of project implementation would ensure that all known utilities are specifically located so that the project can fully avoid the existing utilities or initiate early coordination with the utility provider to reduce and limit interruption of service; this would serve to minimize potential for unanticipated impacts.

Generally, the listed cumulative projects would not result in new construction with substantial increase in demand for utilities or public services. Similar to the proposed project, the cumulative sand nourishment projects would also have a fairly minimal demand for the provision of utilities and would generally not have permanent need for service. Some cumulative projects would serve to improve or replace old or failing utility infrastructure in the area, such as the Sewer Force Main Replacement, Olivenhain Trunk Sewer Project, and JPA Recycled Water Expansion Improvements. Associated with the I-5 North Coast Corridor project, Caltrans is planning a fiber connection to LOSSAN through the lagoon area (Peace 2015). A large project such as the I-5 North Coast Corridor or LOSSAN double-tracking projects would likely require extensive coordination with public service providers due to necessary infrastructure relocations to avoid interrupted service; however, it is not the type of project that necessitates a substantial increase in the long-term demand for public services or utilities.

Because the project does not result in the need for new systems or substantial alterations to existing systems that would have environmental impacts, the proposed project does not make a cumulatively considerable contribution to a cumulative direct or indirect adverse impact to utilities or public services under any alternative.

5.3.15 Hazardous Materials and Public Safety

Other cumulative projects, such as the I-5 North Coast Corridor and LOSSAN double-tracking projects, may also occur within the lagoon basin in an overlapping timeframe with the SELRP and would also be required to comply with all regulatory safety requirements regarding hazardous materials. The mandatory adherence to regulatory requirements limits potential for cumulative risks associated with the use of hazardous materials. Mitigation has been included that would require the proposed project to implement a sediment management plan to avoid risks associated with unknown contaminants that might be encountered during dredging activities and would ensure that the proposed project would not make a considerable contribution to a public safety risk from unknown contaminates.

As described in Section 3.15, the new inlet and CBFs proposed as part of Alternative 2A could pose a safety hazard to persons who stray too close to these areas as some individuals may place themselves in situations that may result in injury should they be thrown against the CBFs or swept into the inlet or a rip current. Mitigation is included in the proposed project to provide improved lifeguard proximity to this area and public awareness signage. Extensive project design features have been included to ensure no adverse safety hazards result to vessels or the public during project construction for all alternatives.

Implementation of the other cumulative sand nourishment projects could have similar public safety hazards during materials placement. However, as demonstrated with the proposed project, these safety hazards are avoidable through appropriate signage, closures, fencing, barricades, and safety personnel. Additionally, development of cumulative projects would be subject to all regulatory requirements specific to the safe handling and transport of hazardous materials, thus minimizing potential for increased public safety hazards.

The public safety hazard created by the new inlet and CBFs is an extremely localized impact, affecting only the immediate area of those project features, and is mitigated. **Thus, the project does not make a cumulatively considerable contribution to a direct or indirect cumulative public hazard impact.**

5.3.16 Global Climate Change and Greenhouse Gas Emissions

A single project is unlikely to have a significant impact on global climate change. However, the cumulative effects of worldwide GHG emissions have been clearly linked to changes in the atmosphere and identified as the main cause of global climate change. For this reason, analysis of GHG emissions from the project, as provided in Section 3.16, is considered a cumulative impact analysis. Section 3.16 provides a complete analysis of GHG emissions for the proposed project and alternatives. The County of San Diego has established a threshold of 900 MT CO2e per year as a project-level GHG significance. The GHG emissions from construction and maintenance activities associated with lagoon restoration and materials disposal/reuse for Alternative 2A and Alternative 1B exceed the significance threshold of 900 MT CO2e per year used for analysis of this project. Construction and maintenance GHG emissions for Alternative 1A would not exceed the recommended level of significance. Mitigation measures required of Alternative 2A and Alternative 1B to reduce GHG emissions include GHG-1, which would evaluate the feasibility and efficacy of performing on-site material hauling with trucks equipped with on-road engines; GHG-2, which would limit deliveries of materials and equipment to the site to off peak traffic congestion hours; GHG-3, which would evaluate the feasibility of restricting all material hauling on public roadways to off-peak traffic congestion hours; and GHG-4 requiring use of high-efficiency equipment. However, these mitigation measures would not reduce emission levels to below the acceptable threshold. **Therefore, implementation of Alternative 2A and Alternative 1B would result in a cumulatively considerable contribution to GHG emissions or global climate change**. As described in Section 3.115.4, no feasible mitigation beyond those measures described above have been identified at a project level to lessen or further reduce emissions to below a level of significance. There are also no additional feasible cumulative mitigation measures available to reduce GHG emissions from construction or operational activities.

Specific to sea level rise and extreme events, the proposed project and alternatives (to varying degrees) would provide a benefit by maintaining and enhancing tidal exchange with the ocean. This enhancement would increase the ability of the lagoon to slowly adapt to changes in sea level over time. Additionally, lowered flood elevation would provide resiliency against floods, other extreme events, and sea level rise. **Therefore, regardless of other projects' cumulative contributions to sea level rise or extreme events, the proposed project and its alternatives would not result in a cumulatively considerable direct or indirect contribution to sea level rise. The project would result in an overall beneficial outcome.**

CHAPTER 6.0
OTHER CEQA/NEPA CONSIDERATIONS

This chapter addresses other topics required by CEQA and NEPA in an EIR/EIS:

- Irreversible and irretrievable commitments of resources and significant irreversible environmental changes
- Growth-inducing impacts
- Relationship between local short-term uses of the environment and long-term productivity
- Effects found not to be significant
- CEQA Appendix F Energy Evaluation

The analysis of the items above is not appreciably different from one alternative to another, but largely relates to whether the project is constructed. Therefore, this discussion does not differentiate between project alternatives.

6.1 SIGNIFICANT IRREVERSIBLE CHANGES TO THE ENVIRONMENT OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

State CEQA Guidelines (14 CCR 15126.2[c]) and NEPA (40 CFR 1502.16) require analysis of significant irreversible and irretrievable effects. CEQA requires evaluation of irretrievable resources to ensure that their use is justified. NEPA requires an explanation of which environmental impacts are irreversible or would result in an irretrievable commitment of resources.

Resources that are irreversibly or irretrievably committed to a project are those typically used on a long-term or permanent basis; however, some are considered short-term resources that cannot be recovered and are thus considered irretrievable. These resources may include the use of nonrenewable resources such as fuel, wood, or other natural or cultural resources. Human labor is also considered a nonretrievable resource because labor used for the proposed action would not be used for other purposes. The unavoidable destruction of natural resources that limit the range of potential uses of that particular environment would also be considered an irreversible or irretrievable commitment of resources.

The proposed project would involve two types of resources: (1) general industrial resources, including capital, labor, fuels, and construction materials; and (2) project-specific resources, such as biological resources, water and soil/sediment resources, land uses, and landforms and visual qualities at the affected sites. The following industrial resources would not be retrievable:

- Nonrenewable resources such as gasoline and diesel oil would be used to power construction equipment and vehicles.
- Nonrenewable energy resources and labor would be necessary to operate barges, trucks, pumps, and equipment used during construction and maintenance activities.
- Electrical power would be used for lighting and potentially dredge operations.
- Energy resources would be required to power the pumps at the intakes and to transport dredged materials to placement sites.

Generally, irreversible environmental changes to the natural environment would occur within the lagoon study area to be excavated and dredged. Many soil and aquatic bottom-dwelling organisms (e.g., plants and invertebrates) living in the lagoon would be destroyed by the construction activities. Although substantial evidence (see Section 3.6 [Biological Resources]) indicates that recolonization and recovery of biological communities would occur in these areas, the length of time can be variable (e.g., 1 to 2 years), and the species occurring would be determined by the type of habitat created. However, the overall project would create a net gain in more biologically productive wetland habitats than presently exist in the project area and would not result in a significant irreversible change to the environment. In addition, construction of a tidal inlet and associated CBFs under Alternative 2A is not an irreversible change. If the wetland were diked to reduce the tidal prism, the inlet would let sand in and CBFs could be removed. The materials placement activities in the cities of Encinitas, Solana Beach, and San Diego would result in the placement of between 160,000 and 1.4 mcy of dredged beach-compatible fill material. This project component would increase protection of existing beaches, which not only provide recreational opportunities for residents but also contribute to the regional tourist industry.

6.2 GROWTH INDUCEMENT

Section 15126(g) of the CEQA Guidelines and the CEQ NEPA Regulations (42 CFR 1508.8) require a discussion of potential growth-inducing impacts of the proposed action and alternatives. Growth may be considered beneficial, adverse, or of no significance environmentally, depending on its actual impacts to the environmental resources present. A project may be growth inducing if it does any of the following:

- Results in development of direct population-generating uses
- Provides accommodations for growth or removes obstacles to growth
- Requires expansion of public services or utilities
- Directly or indirectly fosters economic growth
- Sets a precedent or facilitates other activities that could significantly affect the environment

Restoration of the San Elijo Lagoon and associated materials placement activities would not be considered growth inducing. The proposed project does not include the development of new housing or population-generating uses that would directly or indirectly induce population growth, remove obstacles for future growth, or generate increased demand for public services and utilities in the project area. The proposed project would temporarily require construction workers, but most would be expected to come from the local workforce. While the proposed project would enhance the existing ecological functions of the lagoon and would continue to provide passive recreation opportunities, it is not anticipated that the project would attract sufficient numbers of new visitors to induce the expansion of existing tourist-related commercial uses. The materials placement component of the proposed project would result in a temporary increase in beach area and sand cover at each of the on beach placement sites and would provide for an offshore stockpile of materials for future opportunistic uses. A benefit of this activity would be enhancement or continuation of the recreational usage of each of the onshore placement sites. It must be emphasized, however, that such localized recreational benefits would be temporary (the maximum lifespan of onshore materials placement is approximately 5 years), although the dispersed sand may continue to cycle in the littoral system past that time. The resulting temporary recreational benefits derived from the additional beach area would not be expected to increase the demand for public services and utilities, nor create a need for additional recreational facilities above current projections.

6.3 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The CEQ NEPA Regulations (40 CFR Part 1500 et seq.) require that an EIS discuss issues related to environmental sustainability. In general, this discussion is not considered an environmental effect for which either significance is defined, or mitigation is recommended. However, the discussion, as it relates to environmental consequences, must be included in the EIS. This requires consideration of "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (42 USC 4332[C][iv]).

Short-term use of the environment includes dredging and excavation activities as well as placement of dredged materials in offshore, nearshore, and onshore environments as identified in Chapter 2 and analyzed throughout this document. Short-term construction-related impacts, defined for this project as impacts that occur during construction to project completion, are anticipated from these activities:

- Temporary restrictions to public access in portions of the lagoon and the inlet/beach area to maintain public safety
- Temporary increase in turbidity within the lagoon from construction activities, which could negatively impact water quality for a very short duration (less than 1 day)
- Temporary increases in turbidity and siltation from materials placement at the offshore stockpile sites and/or nearshore Cardiff, which could affect diving conditions
- Temporary restrictions to public beach areas at onshore materials placement sites to maintain public safety
- Temporary visual impacts associated with the presence of construction equipment within the lagoon and at materials placement sites, vegetation removal within the lagoon, and construction of CBFs
- Alteration of existing habitats and displacement or inadvertent extirpation of some organisms, particularly bottom- and soil-dwelling invertebrates and plants
- Temporary traffic-related impacts due to Coast Highway 101 bridge construction or improvements
- Temporary construction emissions in the immediate vicinity of the project site during the approximately 3-year construction period
- Potential for overhead electric poles within the lagoon to be relocated causing minimal or no disruption to service

However, as a whole, the project would create a long-term net benefit overall, defined as 50 years after project completion. Benefits are as follows:

- Helping to restore aquatic functions by opening the tidal channel and maintaining tidal exchange between the ocean and lagoon/wetlands, thereby improving water quality and health of wetland habitat
- Restoring habitat and improving existing habitat values, thereby benefiting threatened and endangered species (light-footed Ridgway's rail and Belding's savannah sparrow)
- Increasing acreage of tidal habitats with beneficial impacts on associated species

- Improving functions and values of existing tidal habitats with beneficial impacts on associated vegetation communities
- Creating nesting areas that would benefit least tern and snowy plover and other waterbirds that may use these sites and would contribute to the restoration of ecosystem functions and values
- Improving lagoon hydrology, which would generally reduce current flood-related hazards to existing infrastructure and adjacent development
- Enhancing tidal circulation, which would facilitate the control of vectors at the lagoon and reduce the public health risk associated with vector-borne diseases
- Preserving the site as an open space reserve and passive recreational area
- Providing beach and littoral cell nourishment along San Diego's north county coastline

6.4 EFFECTS FOUND NOT TO BE SIGNIFICANT

Section 15128 of the CEQA Guidelines requires that the EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR." An Initial Study was not prepared for the proposed project; therefore, a brief description of the issue area where effects were found not to be significant is included Table 6-1.

Table 6-1
Effects Found Not to Be Significant

Environmental Issue Area	Effects Found Not to Be Significant Rationale
Agricultural Resources	This project would not convert farmland to nonagricultural use, nor would this project conflict with the existing agricultural zoning, as there is no farmland in the project area. No changes to the existing environment that could result in conversion of farmland to nonagricultural use would occur.
Mineral Resources	No mineral resource that would be valuable to the region and the residents of California would be lost as a result of this project. This project would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. Preliminary testing of subsurface deposits indicates that no known mineral resources would be affected by the proposed project.
Population and Housing	The proposed project does not include the development of population-generating uses and would also not displace any existing housing, nor would the project displace any people.

The remaining issue areas included in Appendix G of the CEQA Guidelines were evaluated in detail in Sections 3.1 through 3.16 of this document.

6.5 CEQA APPENDIX F ENERGY EVALUATION

Public Resources Code Section 21100(b)(3) and CEQA Guidelines Section 15126.4 require EIRs to describe, to the extent relevant and applicable, the wasteful, inefficient, and unnecessary consumption of energy caused by a project. Also, CEQA Guidelines, Appendix F, Energy Conservation, states that EIRs are required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

The SELRP would result in the consumptive use of energy required to operate dredges, trucks, pumping equipment, grading equipment, and equipment associated with Coast Highway 101 bridge work. Energy sources such as gasoline and diesel oil would be used to power construction and maintenance equipment and vehicles such as barges, trucks, and pumps. Electrical power would be used for lighting and, potentially, dredge operations.

All alternatives would require the use of energy for project implementation in a generally similar nature, but would vary in degree. Alternative 2A would require the highest level of energy consumption because it would involve the largest volume of dredged material and material placement, and construction of a new Coast Highway 101 bridge. Alternative 1B would require similar energy consumption as Alternative 2A, but at a slightly lower amount due to less dredging and material placement, and only retrofit work on the existing Coast Highway 101 bridge. Alternative 1A would require the least amount of energy use for implementation because it would involve the lowest volume of dredged material and placement, and only retrofit work on the existing bridge. The No Action Alternative would not require energy consumption for construction, as none would occur.

Elements of the project design lend themselves to energy savings, such as the reuse of dredged materials in the littoral zone or local beaches where the material can be pumped directly or be delivered by a short barge trip that minimizes the energy expenditure that would otherwise be required to haul the dredged material to a landfill or other disposal site. Once completed, the SELRP would not generate additional daily vehicle trips, necessitate an increased need for ongoing energy use, or require other energy-consuming activities, with the exception of periodic maintenance.

With the exception of the construction or retrofit work on the Coast Highway 101 bridge, restoration of the lagoon and placement/disposal of the material would not include construction of structures or other development that would require substantial deliveries or truck trips to transport building materials to the site, or create additional sources of long-term energy consumption. Because of the existing seismic deficiencies of the Coast Highway 101 bridge, it is likely that the work proposed to replace or retrofit the bridge would be undertaken through another project in the near future, if not through the SELRP, and similar energy expenditures would be required.

Although the project would require the use of a variety of energy resources, the energy used for implementation of the SELRP is not considered wasteful, inefficient, and/or unnecessary. The necessary energy consumption would result in the positive benefits of improved lagoon hydrology and ecology, as well as a structurally sound Coast Highway 101 bridge.

Because no energy-related impacts were identified, there are no mitigation or minimization measures proposed. However, certain project design features for the project would promote energy efficiency and would decrease overall energy consumption. For example, PDF-10 requires all equipment engines to be in good working condition and to minimize idling time, and PDF-43 requires that two-way circulation be maintained at all times on public roads, which would avoid the need for lengthy delays or detours.

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CHAPTER 9.0
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CHAPTER 10.0
ABBREVIATIONS

AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disability Act
ADT	average daily traffic
ADT	average daily traffic
APE	area of potential effects
AQMP	Air Quality Management Plan
ARB	Air Resources Board
ASBS	Area of Special Biological Significance
Basin Plan	*Water Quality Control Plan for the San Diego Basin*
BFE	Base Flood Elevation
bgs	below ground surface
BMP	best management practice
BNSF	Burlington Northern Santa Fe Railway
BSA	Biological Study Area for SELRP
BTR	Biological Resources Technical Report
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CAMUTCD	California Manual of Uniform Traffic Control Devices
CBF	cobble blocking features
CCA	California Coastal Act
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCR	California Code of Regulations
CCSTWS	Coast of California Storm and Tidal Wave Study
CDFG	California Department of Fish and Game (currently CDFW)
CDFW	California Department of Fish and Wildlife (previously CDFG)
CDMG	California Division of Mines and Geology
CDP	Coastal Development Permit
CEDAS	Coastal Engineering Design and Analysis System
CEQ	Council for Environmental Quality

CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CIDH	cast-in-drilled-hole
CLOMR	Conditional Letter of Map Revision
CMP	Congestion Management Plan
CNEL	community noise equivalent level
CNG	compressed natural gas
CNPS	California Native Plant Society
Corps	U.S. Army Corps of Engineers
County DPR	County of San Diego Department of Parks and Recreation
County	County of San Diego
CRA	California Resources Agency
CRHR	California Register of Historic Resources
CSC	California Species of Special Concern
CSCC	California State Coastal Conservancy
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DA	Department of the Army
DBW	California Department of Boating and Waterways
DHS	Department of Health Services
DNL	Day/night average sound level
DOC	California Department of Conservation
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
DPH	Department of Public Health
EA	Environmental Assessment
EFH	essential fish habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ENSO	El Nino-Southern Oscillation
EPA	U.S. Environmental Protection Agency
ERL	Effects Range – Low
ERM	Effects Range – Median
ESA	Endangered Species Act
ESHA	Environmentally Sensitive Habitat Areas
FBFM	Flood Boundary and Floodway Map
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

FIRM	Federal Insurance Rate Map
FTA	Federal Transit Administration
GHG	Greenhouse gas
GPS	Global Positioning System
GWP	global warming potential
HA	Hydrologic Area
HAPC	Habitat Area of Particular Concern
HCM	Highway Capacity Manual
HDPE	high-density polyethylene
HU	Hydraulic Unit
HUD	U.S. Department of Housing and Urban Development
I-5	Interstate 5
IPCC	Intergovernmental Panel of Climate Change
ITM	Inland Testing Manual
ITP	incidental take permit
JPA	Joint Powers Authority
lagoon	San Elijo Lagoon
LCFS	Low Carbon Fuel Standard
LCFS	low carbon fuel standard
LCP	Local Coastal Plan
LEDPA	Least Environmentally Damaging Practicable Alternative
LNG	liquefied natural gas
LOMR	Letter of Map Revision
LOS	level of service
LOSSAN	Los Angeles to San Diego Rail Corridor Improvements Project
LUP	Land Use Plan
M&N	Moffatt & Nichol Engineers
MBTA	Migratory Bird Treaty Act
MHCP	Multiple Habitat Conservation Program
MHTL	mean high tide line
MLD	Most Likely Descendent
MLLW	mean lower low water level
MLPA	Marine Life Protection Act
MOA	Memorandum of Agreement
MPA	Marine Protection Act
MPN	most probable number
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSCP	Multiple Species Conservation Program
msl	mean sea level

NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NARA	National Archives and Records Administration
NB	northbound
NCTD	North County Transit District
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
North County MSCP	North County Multiple Species Conservation Program
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSF	National Science Foundation
ODM	Ocean Disposal Manual
OFR	Office of the Federal Registrar
OMWD	Olivenhain Municipal Water District
OPR	Office of Planning and Research
OSCP	Oil Spill Contingency Plan
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PA	Programmatic Agreement
PADI	Professional Association of Diving Instructors
PCE	Passenger Car Equivalence
PCE	Primary Constituent Element
PDF	Project Design Feature
PRC	Public Resources Code
PWP	Public Works Plan
RAQS	Regional Air Quality Strategy
RBSP	Regional Beach Sand Project
REMP	Restoration and Mitigation Enhancement Program
Reserve	San Elijo Lagoon Ecological Reserve
ROD	Record of Decision

ROW	right of way
RPS	renewable portfolio standard
RSM	Regional Sediment Management
RWQCB	Regional Water Quality Control Board
SANDAG	San Diego Association of Governments
SANTEC	San Diego Traffic Engineers' Council
SAP	Sampling and Analysis Plan
SB	southbound
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCC	State Coastal Conservancy
SCE	Southern California Edison
SCIC	South Coastal Information Center
SCOUP	Sand Compatibility and Opportunistic Use Program
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SDCVCP	San Diego County Vector Control Program
SDED	Supplemental Draft Environmental Document
SDG&E	San Diego Gas & Electric
SDNR	San Diego Northern Railway
SDUPD	San Diego Unified Port District
SELC	San Elijo Lagoon Conservancy
SELDT	San Elijo Lagoon Double Tracking
SELRP	San Elijo Lagoon Restoration Project
SEWRD	San Elijo Water Reclamation Facility
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLC	State Lands Commission
SMARA	Surface Mining and Reclamation Act
SMCA	State Marine Conservation Area
SMGB	State Mining and Geology Board
SPCC	Spill Prevention Control and Countermeasure Plan
SQG	sediment quality guidelines
SRA	Source/Receptor Area
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TDS	total dissolved solids

THPO	Tribal Historic Preservation Officer
TMDL	total maximum daily load
TREP	Transportation and Resource Enhancement Program
USC	United States Code
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
v/c	volume-to-capacity
VMT	vehicle miles travelled
WQO	water quality objective

Chemical Abbreviations

CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
HFC	hydroflourocarbons
N+N	nitrite and nitrate
NO	nitric oxide
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxide
O_3	ozone
Pb	lead
PCB	polychlorinated biphenyl
PFC	perfluorocarbons
PPM	parts per million
$PM_{2.5}$	particulate matter 2.5 micrometers or less
PM_{10}	particulate matter 10 micrometers or less
ROG	reactive organic gas
SF_6	sulfur hexafluoride
SO_2	sulfur dioxide
TKN	Total Kjeldahl nitrogen
TN	total nitrogen
TP	total phosphorus

TSS	total suspended solids
VOC	volatile organic compound

Units of Measurement

cfs	cubic feet per second
cy	cubic yard
cy/yr	cubic yards per year
dB	decibel
dBA	decibel on the A-weighted scale
ft	feet
ft/sec	feet per second
hp	horsepower
Hz	hertz
km	kilometer
kWh	kilowatt hour
kVA	kilovolt ampere
kV	kilovolt
L_{dn}	day-night average noise level
L_{eq}	equivalent noise level
mcy	million cubic yard
mgd	million gallons per day
mg/L	milligrams per liter
ml	milliliters
mm	millimeters
mpg	miles per gallon
mph	miles per hour
MT	million tons
NTU	nephelometric turbidity unit
ppm	parts per million
ppt	parts per thousand
µm	microns
µg/kg	micrograms per kilogram
µg/L	micrograms per liter

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CHAPTER 11.0
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